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W. R. FISHER, B.A.,

OFFG. DIRECTOR, FOREST SCHOOL, DEHRA DUN.

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THE

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Mr. BRANDIS' WORK IN BENGAL.

Mr. Brandis' first connection with the Bengal Forests occurred in 1869, with reference to some draft rules for the administration of Government forests in the Lower Provinces, which were drawn up by the Government of Bengal, and sent up for sanction to the Government of India.

The Government of India returned the rules with a memorandum by Mr. Brandis, pointing out their unsatisfactory character, and suggested that the question of new forest rules for Bengal should be deferred till the new Forest Bill had been passed by the Legislative Council.

Mr. Brandis objected to the distinction in the rules between reserved and open forests as not admissible under the Act, and also to there being no provision authorizing Forest officers to arrest persons infringing the rules, and because all power of confiscation was omitted.

This latter omission was due to a defect in the old Forest Act VII. of 1865, under which fines could only be imposed, where confiscation of implements was not provided for, and thus, as the Government of Bengal pointed out, the offender might escape with the trifling penalty of confiscation of an axe or a saw.

We have next a report by Mr. Brandis on the management of forests in the Jalpaiguri and Darjeeling Districts of Bengal, which he visited in January, February, May, November and December 1879.

The report commences with an account of fire protection in the Jalpaiguri sál forests, of which the Buxa and Apalchand reserves are the most important. The complete fire protection of those two forests is advocated by means of a series of fire lines, and two broad interior lines, 200 yards wide, burned through the midst of the forest. To those acquainted with the height of the grass in the Bengal sál forests, and the fierceness of the jungle fires, this great width advocated for fire lines will not appear at all excessive. Preliminary fire conservancy was advo-

cated for the other forest blocks, the grass in the open savannahs being burned early in the season, when that inside the forests is too damp to burn.

Mr. Brandis criticised the system of roads laid out at right angles to the drainage of the country, and advocated other roads between the watercourses and following the natural configuration of the ground, being in straight lengths wherever the nature of the ground would admit it. The forests being made accessible to carts by means of these roads, he hoped that a trade in dead timber would soon arise, as had already happened in the Oudh forests, the purchasers removing standing dead timber at fixed rates.

The attempts to grow teak in the Duars had been abandoned, the climate being considered unsuitable, though it seems to us on somewhat insufficient grounds. Some progress had been made in sál plantations, and Mr. Brandis advocated the use of strong transplants which had been bedded out in the nurseries several times, and were at least 2 feet high at the time of planting. The growth of grass tends to choke or draw up the plants into tall thin sticks, but if completely cleared they are apt to suffer from drought, hence the necessity for using large strong transplants.

Regarding the timber operations in the Baxa reserve, it had been prescribed in Dr. Schlich's working plan that 5,520 trees should be felled annually, but during the first four years only 2,800 had been felled, on the average, the reason being that owing to the abandonment of the proposed Rungpur-Dhubri Railway the demand for railway sleepers had greatly fallen off.

In spite of this, a large quantity of felled timber had been left growing in the forest, which was exposed to injury in case of fire occurring. Mr. Brandis, therefore, advocated more restricted fellings than those prescribed in the preliminary working plan, which as preliminary should be elastic. He also deprecated felling of fine trees within 50 feet of the roads, and within 100 feet of all open savannahs and of the boundary line, where a belt should be left to diminish the danger from fire, and to increase the chance of natural generation in the grass land outside the belts.

The sale depôts were at Alipur in the Duars, Kaunia, the terminus of a branch of the Northern Bengal Railway, on the Tísta river, and at Dacca.

At the latter place, sál from the Duars could not compete with the magnificent timber from Nepal, for which Rs. 4 per cubic foot was obtained, whilst only Re. 1-12 to Rs. 2 was offered for Duars timber.

There was also considerable difficulty in selling sissú wood, of which there is a fairly large supply, and Mr. Brandis advocated its being brought out in planks 3 to 6 inches thick,

and 10 feet long and as broad as possible, he also advised that considerable quantities of the inferior timbers should be experimented on as railway sleepers. Considering the large quantities of hard woods which the Assam forests supply, it would, however, be useless for the railways to attempt to use the softer inferior woods of the Northern Bengal forest, in which sál is the only timber fit for sleepers which is produced in any quantity.

The financial results of the working of the Jalpaiguri and Baxa Divisions for the preceding six years showed a deficit of nearly Rs. 40,000, but Mr. Brandis hoped that an equilibrium might be established by careful working for the future. If good Rangers were available in Bengal, it might be thought that the two divisions, which are both in one civil district, might be safely united into one.

The description of the standing crop in the Baxa Forest is very good—

"In certain portions of the Baxa reserve sál is found almost pure, or at least is the prevailing tree. In such localities, the forest is well stocked with a fine crop of well shaped poles, or immature trees from 90 to 110 feet high, and from 2 to 4 feet in girth, with occasionally an old tree among them.

"From what we know of the growth of sál, it may be inferred that these areas will be fit for cutting in say from 50 to 80 years. The large extent and good condition of the areas stocked with this class of forest constitute one of the most favorable features in the reserve; but there are other tracts of older forest, where sál is mixed with other kinds, and where it is by no means the prevailing tree. In the upper parts of the reserve (chelauni) *Schima Walichii*, and *Lagerstræmia parviflora*, *Dillenia pentagyna* and *Careya arborea* are common, but besides a few simal and chelauni trees to make dugouts, which are required by the parties removing dead logs, hardly any wood of other kind than sál is sold."

The next visit was to the Kurseong forests, where protection from fire of 10,170 acres of sál forest was being attempted, and detailed advice as to the measures to be adopted was given, at an estimated annual cost of Rs. 421 per 1,000 acres. In this division, 858 trees had been felled per annum since 1877-78, and the surplus for the last three years was nearly Rs. 60,000.

The third chapter of the report deals with the hill forests in British Sikkim, which form the Darjeeling Division. These forests are on three spurs radiating from a central point at Jore bungalow, at the foot of the Senchal mountain, and each spur forms a separate range, the total area of the reserved forests being 20,963 acres.

These forests are required for the fuel and timber supply of Darjeeling, but only an area of 9,384 is sufficiently accessible, and of this, we quote from the report :—

"A large portion lies at an elevation greater than 7,500 feet, where

in this district natural reproduction is exceedingly slow and uncertain, and where probably only very cautious selection fellings can be made, at any rate, for many years to come. Another portion lies at an elevation of from 7,000 to 7,500 feet, where reproduction, though better than at higher elevations, is not yet easy or certain, so that only a portion which may be estimated at between one-third and one-half of the whole area, remains at an elevation less than 7,000 feet, where, if the circumstances are otherwise favorable, reproduction may generally be counted upon.

"As a rule, it may be said that in India the greater the moisture, the more vigorous is the forest growth. But there are certain notable exceptions, and the higher hills of the Darjeeling District may be regarded as an instance in which excessive moisture causes the trees to grow slowly, and the natural reproduction to be uncertain.

"At lower elevations, where the temperature is higher, the process of transpiration through the leaves is more active; but above 7,500 feet it seems as if vegetation was almost stagnating during part of summer, while the air is saturated with moisture, and there is no sunlight to stimulate the action of the leaves."

At the time of Mr. Brandis' visit the steam tramway was being constructed, and by means of this and some new forest roads it was hoped to render an area of 12,257 acres available for the supply of Darjeeling, the annual requirements of which were—

	Maunds.
Firewood, ...	160,000
Charcoal, ...	10,000

or assuming that four maunds of firewood go to produce one maund of charcoal, the total amount of wood required is placed at 200,000 maunds. It was also estimated, that for the feed of the upper end of the tramway, 73,000 maunds would be required, but as the engines were then burning coal this item was omitted.

Mr. Brandis estimated that 100 maunds of wood corresponded to 175 solid cubic feet, so that the requirements of Darjeeling are—350,000 cubic feet, plus 150,000 of building timber, equal to 500,000 cubic feet per annum.

The yield per tree felled increased from—

45	maunds in	1877–78
to 111	do.	1878–79
and 285	do.	1879–80

this is partly due to the trees cut in former years being smaller, the practice at the time of Mr. Brandis' visit being to reckon nothing as a tree with a less girth than 3 feet, and a bole less than 20 feet, which was not the practice in 1877-78; but the chief cause of the increased outturn was that stumps of trees afterwards previously felled and of dry wood lying in the forests were utilized on a large scale, and that a considerable portion of the outturn was derived from this source, and not from trees felled.

Mr. Brandis advocated the strictest economy in utilizing stumps, roots and dry wood, and thus hoped that an outturn of 500,000 cubic feet of solid wood might be obtained by felling 2,500 trees annually, or at the rate of 200 cubic feet per tree. He admitted that the trees actually felled would not yield more than 100 to 150 cubic feet on an average, but hoped to obtain the balance by utilizing dry wood, and proposed to break up large stumps by means of powder or dynamite.

A calculation of the number of years during which the different blocks should be worked to give this yield of 2,500 trees per annum is sketched, and 74 years is the rotation selected for the whole area of 12,257 acres, the acreage worked over in any particular year varying according to the conditions of the growing stock, the nature of the soil, gradient, prospects of reproduction and other circumstances.

Thus the following summary gives the number of trees to be felled in each range:—

Name of Range.	Area in Acres.		Years.	Number of trees to be felled.	
	Above 7,500′.	Below 7,500′.		Total.	Per acre, below 7,500′.
Gumpahar, ...	412	3,400	25	62,500	18
Takdah, ...	697	4,336	38	95,000	22
Rangbul, ...	1,476	1,936	11	27,500	14
Total, ...	2,585	9,672	74	185,000	

Regarding the selection of the trees to be felled we quote as follows:—

"It is not intended to make complete clearances anywhere. Protection belts against wind must be left, and a proportion of young vigorous trees should remain in bands and groups, preference being given to the more valuable kinds for timber, and to those, such as maples, which are most likely to facilitate reproduction.

"A remarkable feature in these forests is the scanty natural reproduction, particularly at higher elevations, seedlings of oak are extremely rare, those of laurels found here and there, but not common, seedlings of maples, of the useless *Evodia fraxinifolia* are most frequent. Even where cattle are excluded, self-sown seedlings are scarce, except below 7,000 feet. Hence natural regeneration will not suffice to re-stock the forest, and planting must be resorted to."

Seed is however not readily obtainable, and "owing to the extreme damp, incessant rain and dense fog from May till September, and the extremely dry weather from February till April,

young woody plants develop with difficulty, and have to contend with a luxuriant growth of herbs, brambles and other shrubs." Mr. Brandis advocates exclusion of cattle and fires, and sowing or planting in horizontal bands and lines, 20 to 30 feet apart, the plants being close together in the lines, so as to render supervision and clearing more efficient.

Mr. Brandis admits that by the system he proposed no material will be available except the forest above 7,500 feet, at the close of the 74 years, and that a yield of 40 cubic feet per acre per annum is very small, but he hoped then that more distant forests might eventually be rendered available by improved communications, and that it might be possible to lease a large adjoining private forest belonging to the Tchebu Lama, which was rapidly deteriorating through firing, grazing and charcoal making.

The fourth chapter of the report deals with the forests in the Tísta and great Rangít river valleys, forming the Tísta division, where most of the land had been given over to tea and cinchona and native cultivators, and where the reserved forest consisted of tracts below 3,000 feet elevation, in which sál is predominant, and of higher tracts above the range of sál.

Timber from these forests is required for export and for the requirements of tea estates.

Sál grows to perfection in the Tísta and great Rangít valleys, and an instance is given of a sál tree measuring 161 feet in total height, 86 feet of bole, and girth of 10 feet 8 inches at 4 feet from the ground.

The other valuable trees are—Tún, of which Mr. Brandis says that there are probably three species mostly between 3,000 and 6,000 feet elevation, and which is in great demand for tea boxes, gambhar (*Gmelina arborea*), sissú and *Ficus elastica*, but the trees had not recovered from excessive tapping in 1874. Other trees, such as simál and lampatia, the Assam kokan (*Duabunga grandiflora*) and *Canarium nepalense* were noted as probably useful for tea boxes.

One of the finest trees of these forests is mandania, *Acrocarpus fraxinifolius*, which attains large dimensions. The dimensions are given for two specimens as follows :—

	No. 1.	No. 2.
	feet.	feet.
Total height, ...	181	157
Height of bole, ...	110	100
Girth, ...	10	10

Regarding the forest growth of the high level forests, which is also common to those of the Darjeeling Division, we read that there are several species of magnolias—*Michelia excelsa*, common on the main ridge between 6,500 to 8,000 feet being the best; *Schima Wallichii* up to 5,000 feet is very common; Gobria (*Echinocarpus dasycarpus*), a large useful tree. The maples comprise *Acer oblongum* and *Thomsonii* between 2,000 and 5,000 feet; *Campbellii* and *Hookeri* forming the chief deciduous trees above 6,000 feet. Maple wood is largely used for tea boxes.

Other trees are *Bucklandea populnea*, *Terminalia tomentosa* and *myriocarpa*, *Morus lœvigata*, giving a handsome yellow wood, and *Engelhardtia spicata*. Of the laurels, *Machilus odoratissima* and *Phœbe attenuata* from 5,000 to 8,000 feet. Oaks and chestnuts include *Castanopsis indica* and *tribuloides*, the former to 5,000 and the latter to 6,000 feet. *C. rufescens* and *Quercus lamelosa* and *annulata* from 6,000 to 8,000 feet, and *pachyphylla* 7,000 to 10,000 feet. The wood of *C. rufescens* and *Q. pachyphylla* is devoid of large medullary rays, and is not liable to split and warp like that of other large oaks. A birch, probably *Betula cylindrostachys*, is found up to 6,000 feet, sometimes gregariously, and *Prunus Puddum* and the walnut are not uncommon.

Mr. Brandis gives an interesting account of the jhumes of the Bhutirs, and of the terraced irrigated rice fields of the settlers from Nepal, and states that 6,000 feet is the limit of cultivation, and that forests above that elevation should be preserved; to the west of the Tista river, for the supply of Darjeeling and of the tea estates, and to the east of the Tista, for pasturage.

Grazing concessions were already allowed in the reserved forests east of the Tista, and in order that these privileges might not eventually become rights, Mr. Brandis proposed that small grazing fees of 8 annas per head per annum should be levied, and that the blocks open to pasture should be defined, and should be protected against fire, and closed to grazing for a number of years if any fires should occur. We quote as follows:—

"Although, as above explained, it will not be possible to look upon these high level forests, thus proposed to be thrown open to pasture, as a permanent source for the supply of wood and timber, yet some precautions should be taken to prevent their deterioration through fires, lopping, and the cutting of saplings. With the exception of the northern slopes and of certain moister places, all these forests had been burned in 1879, and the destruction and damage done was enormous.

"It is to be expected that with the increase of population the herds of cattle sent to pasture in these hills will increase very considerably. The herdsmen will naturally desire to set fire to the forest for their own convenience.

"It should, therefore, I think, be provided that if any portion of these forests is burnt, the locality so burnt will at once be closed against cattle for a series of years, until the forest has recovered.

"The provision of the Indian Forest Act, section 78, which requires aid in extinguishing and preventing fires by all persons permitted to pasture cattle in the forests, will have to be strictly enforced in this district."

Although the first class forests were extended chiefly for timber, this need not exclude limited grazing, and the second class forests are chiefly to be used for pasture. The chief difficulty with the Tísta forests was financial, there having been a deficit of Rs. 30,000 in three years, but Mr. Brandis hoped that by care and economy an equilibrium between receipts and expenditure might be arrived at.

We quote a remark which is the foundation of the steady progress made in the surplus revenue of Indian forests :—

"Under existing circumstances in India the extent of forest divisions and the strength of the staff of Forest officers to be assigned to each must not be regulated mechanically by the number of acres to be managed, but must, to a much larger extent, depend upon the nature of the work, and the quantity of material required from the area. Forests which must be worked extensively obviously require a stronger staff than those where protection is the chief work to be accomplished."

THE PRIVILEGES IN THE BAHRAICH GOVERNMENT FORESTS.*

No rights in the Bahraich Government forests.—The whole of the State forests in Bahraich are reserves coming under

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Note.—The great violence of forest fires in the Sikkim forests may be gathered from a description by Mr. Gamble, which we give :—

"On the 24th March, 1881, I was present at the burning of a tract of savannah forest belonging to the Chumta Tea Estate. The tract to be burned was cleared on all sides for a distance of 60 to 100 feet. The day was quite calm and rain had fallen two days before. But the mass of jungle was so dense that the flames swooped down on the grass on the opposite side of the cleared line, which was fully 60 feet wide. The heat was so great that it was hardly possible to stand at a distance of 20 yards on the opposite side of the fire line, and the leaves on the branches with which we provided ourselves were withered by the heat. Several flames burst out 20 to 30 yards ahead of the fire, from the scorching, radiating heat."—[ED.]

* This memorandum is the substance of one that I submitted to the Deputy Commissioner of Bahraich at a time when there was a question of greatly extending the areas of forest closed to cattle in this district. Since writing it, 60 square miles have been added on to the 37 square miles that hitherto represented the area closed to cattle, and I am in hopes of again increasing this by 20 square miles. "Rubakárs," or charters, are also in process of consideration for each privileged village, and these will, it is hoped, when ready, lay down within precise limits the quantity of material which the former shall annually obtain and at the same time give protection to our administration and security to our control by making these grants subject to conditions of an unmistakable character on the part of the villagers.—E. P. D.

section 3 of the Forest Act. They are not burdened with rights, but with certain privileges only that have been conceded on the understanding that they might be hereafter restricted at will according to circumstances, and according to the behaviour of those enjoying them in their relation to the conservancy of the forests.

Summary of privileges in the Bahraich forests.—If we except the privilege of pasture which is conceded to all alike, the populations living within three miles of the State forests are alone entitled to privileges within them, and this conditionally on their exercise being confined to the collection of what is necessary to them for household purposes. The privileges in the Bahraich forests can, therefore, be summarized as follows :—

1. The privilege of pasture, conceded to the general public.
2. The privilege to timber, and to firewood, and to various articles of minor produce, conceded to all cultivators living within three miles of the forests, and which can be classed into the following :—
   (*a*), timber for house-building ;
   (*b*), „ the construction of wells and bridges ;
   (*c*), „ the erection of platforms or "machâns ;"
   (*d*), „ the manufacture of implements and utensils ;
   (*e*), firewood;
   (*f*), thorns for fencing ; and
   (*g*), grass for thatching purposes.

The privilege of pasture.—The privilege of pasture is, as has been already mentioned, an unlimited one in respect of the number of persons who are entitled to benefit by it. There is no more serious question attaching to the Bahraich forests than this one of pasture. Upon payment of a rate, that is, in all cases, far too nominal in amount—2 to 8 annas per head per annum—to have any effect in keeping the cattle within bounds, every body can send into these forests as many cattle as he thinks fit. We can fancy the joy of an English farmer to whom should be given the opportunity, on payment of the above rate of from five pence to a shilling per head per annum, to graze as many head of cattle as he felt inclined to within a neighbouring and conveniently situated property of 30,000 acres, or more. Obviously this person would, if wise, dispose of his very boots to procure one more yearling. And in effect this is what is done in Bahraich. Not only do all the cultivators living off the forests trust more for a living to their cattle than they do to their crops, but a population has sprung up all around, and often within, our forests, of "Ahirs," "Goshis," "Banjaras" and other tribes of professional graziers, who either do not cultivate at all, or till a few patches only in the vicinity of their houses. People from afar again come and add to the dense packing of cows, buffaloes, sheep, and goats that, from year's

end to year's end, crowd through the Bahraich forests, trampling down the soil, wherever clayey by nature, to the consistence of a metalled road, by which means the stock is in many places drying up, and a condition of things being brought about that can only end in the ruin of the forest as a source of useful timber, and that at no distant period of time.

Condition of the Bahraich forests that are open to cattle grazing. Of the 325 square miles of the Bahraich forests, no less than 220 square miles must be classed as forest that nothing but the entire exclusion of cattle, followed in many instances by costly works of improvement, can save from utter destruction as such. Indeed of this extensive area at least 110 square miles is no longer forest except in name. It is past maintaining as forest, and is now, and can be hereafter, only useful in its capacity of affording pasture to cattle.

But the remaining half of this 220 square miles of deteriorated forest is still capable of great amendment under a proper form of treatment. For the most part, it comprises a collection of venerable and hollow old sál trees that stand in somewhat park-like isolation over bush and scrub, over stunted trees and crooked off-shoots, the produce of coppice and of pollard; the only variation being that sometimes the old trees are wanting, sometimes the undergrowth. Reproduction by seed over most of this immense area is either absolutely a failure, or is confined to species of a low order, or, if of sál, it, in most instances, comes to nothing. In the generality of cases the soil is of an adamantine hardness, being clayey by nature and much trodden down by cattle. Here nothing short of expensive artificial works will now conduce to the restoration of the forest to something of its original good condition. The exclusion of cattle alone will no longer avail; or rather we should have to wait a score of years or more for any serious improvement to show itself that had been brought about by these unaided means. However, this is no reason why we should not keep the cattle out if we can do so. On the contrary, seeing how long we have to wait, and how slow the process of improvement must be, we should lose no time in making a commencement, helping nature in the meanwhile by such artificial resources as we possess for creating that stock of valuable young trees that is now wanting.

In spite, however, of the cattle, we have in Bahraich good unclosed forest extending over an area of about 70 square miles. This exceptional circumstance is due to two causes. In the first place, the soil is here very light, and in the second place, the number of cattle is much less. But even here the forests suffer extremely from fires, that other evil and indirect consequence of grazing. Such young poles as we meet with, when not coppice standards, have been burnt down year after year for a score of years before they have been finally able to rise above this certainty of annual extinction.

Area of forest closed to cattle in Bahraich.—Of the 325 square miles that go to constitute the Bahraich forests, only about 35 square miles have been hitherto closed to cattle. This is a pitiful state of things. It is pitiful because we are thus ruining, in favour of a few thousands of individuals, forest which, of a right, belongs to a whole Province. It is pitiful because we are here, in all probability, only materially benefitting two or three great landlords whose wealth is already vast.

Bad policy of not commuting the privileges with which the Bahraich forests are burdened.—It is illogical to suppose that all these graziers are allowed to maintain themselves on the Rajah's land without being heavily taxed for the privileges enjoyed by them in our forests. The very cultivators of the soil are, for the most part, mere tenants-at-will of the talukdár, and it would be unreasonable to suppose that one and all of the privileges enjoyed by the former are not duly considered at the time of fixing the rent to be paid by them. If all the irregulated privileges bestowed by us upon the villagers had any effect in increasing their prosperity, there would be some reason for granting them. But in practice it is only the landlord whom we enrich. I have been told that we owe these privileges to the landlord, without which he would lose much of his income. This being the case, it would surely have been better to have assessed him at a sum which would have recouped him for the absence of these privileges, than to ruin, in his interest, property in which a whole province is concerned! These remarks, of course, apply to all the other privileges with which these forests are burdened.

Necessity for limiting the number of cattle that should be permitted to graze within the forests.—In any case I fail to see how the presence is to be excused of so many cattle belonging to persons who do not cultivate the soil, and of others who come from a distance. Again, there should surely be some limit to the number of cattle that even professed tillers of the soil, and privileged villagers to boot, should be allowed to graze within our forests. However, I am glad to understand that there is now some prospect of our being able to close a considerable additional area of our Bahraich forests; although the object kept in view apparently remains the same, namely, to always have a sufficient area of forest open for cattle grazing; *as if any area could be permanently sufficient for cattle that are not maintained themselves with any limit.*

I cannot do better than conclude what I have to say under this paragraph by inserting the following extract from a letter of the Secretary to Government, North-West Provinces, in the Revenue Branch, to the Secretary to the Board of Revenue, dated Allahabad, the 9th of January, 1885:—

"The Lieutenant Governor and Chief Commissioner agrees in the conclusions arrived at by the local officers that the villagers should

not have the right of *expending* their requirements unlimitedly. The forests cannot stand unrestricted grazing, and the general public, whose supplies of timber are daily becoming more scarce and dear, have claims on the Government which have to be considered as well as those of the villagers adjoining the forests."

Method of collecting the grazing dues.—I have fully entered into a discussion of the method pursued by us in collecting the grazing dues in a former correspondence with the Deputy Commissioner. This method leaves everything to be desired, and we cannot do better than adopt in its place the system just sanctioned by Government for the forests of the Dehra Dún. The main features of this system are :—

(*a*), a periodical cattle census ;

(*b*), the annual collection and payment into the treasury on the part of the village lambardár of the amount assessed to that village on the basis of the aforementioned cattle census ;

(*c*), outstandings to be realized by the tehsildár in the same way as ordinary land revenue ;

(*d*), lambardár to report and to realize the revenue upon any increase of cattle exceeding by 10 per cent. the number included in the last census ;

(*e*), lambardár to be paid for the additional duties thus imposed upon him by a commission of 5 per cent. on the amount of revenue annually realized by him from the cattle of his village.

But, before introducing this new system, I consider that we should, as a first measure, reduce the number of cattle within permanent limits, as already suggested by me, and moreover exclude cattle altogether from our forests—when the latter are not purely grazing reserves—that do not belong to *bonâ fide* cultivators living within three miles of them.

The privilege to timber and other forest produce.—Unlike what we have seen in the case of grazing, the privilege to timber and other forest produce is accorded only to the populations living within a zone of three miles off the Government forests, and those who are not cultivators by profession are not supposed to be included within the privileged classes. The privileged person receives all his domestic requirements in timber, firewood, thatching grass, fencing material, &c., &c., without payment of any kind. The privilege only extends to his personal wants, and it was not intended that he should be supplied with any more than is necessary to him for ordinary household purposes.

The application of this privilege is wanting in definition.—On the other hand, the application of this privilege has been very ill-defined. As matters stand, the privilege can be claimed, provided always the recipient live within three miles of the Government forests, by either the wealthy Rajah, the well-to-do Bunya, the servant, the labourer, or the agriculturist.

This was evidently not the intention of Government. The privilege should apparently only apply to those who are too poor to buy these things, to those who are engaged in the *bonâ fide* cultivation of that land which is assumed to be so preyed upon by the animals of the forest as to be, without this privilege, of very inferior value. The professional man, the merchant, the landlord, should therefore not be included within its scope, and it is necessary that the privilege be so defined in this respect as to render this perfectly intelligible to all.

The privilege is not sufficiently guarded against undue extension.—But although only accorded to the inhabitants of a well defined tract of country, and therefore in some sense limited, this privilege to timber and other forest produce is not protected in the way its importance demands from the possibility of its hereafter exceeding what the forests will be in a position to supply. We may find no difficulty just at present in providing the villagers with what they require, but we should certainly find it very hard indeed to give away in the same proportion to double the present population of the privileged zone. And there is nothing to show why this population should not increase fourfold. On the contrary, the privileges themselves are all encouragement to this increase.

Necessity for fixing in a permanent manner the annual demand of the privileged classes.—It is highly desirable therefore, that, as in the case of cattle previously discussed, so here, the forests should be taxed with a fixed annual demand only, and not with a demand capable of indefinite expansion, such as that with which the forests are now burdened. It is proposed at an early date to furnish each privileged village with a "rubakár," or charter, which shall indicate in an unmistakable manner the privileges to which the village in question shall be entitled. It is to be hoped that this principle of a fixed annual demand will form the basis upon which to build these village charters, without which the conservancy of the forests would be fettered to such an extent as to imperil their very existence.

Village "Rubakars" or Charters.—As in the case of cattle, so here, we have to determine the actual wants of each village in timber and in other forest produce; and the surest and most reasonable way, in my opinion, to obtain such very difficult data, would be to act as follows:—

(*a*). To come to an understanding in respect of the period of time after which supplies of timber should be renewed.

(*b*). To agree as to the proportions of the different kinds of timber which should be allowed in the construction of a villager's house, cattleyard, shed, "machán," &c., &c.

(*c*). To select off each forest a few standard villages, and to determine on the spot, by measurement, the quantity of timber and of other material made use of by them.

(*d*). From the above data to form an average of the annual

requirements of the standard village with a cultivated area of 100 acres: in other words, to reduce the average annual requirements of the standard village to the unit of cultivated ground possessed by it.

(*e*). To apply this average to all the other villages off the forest in question, according to the cultivated area of each.

Description of timber and of other forest produce to which the privileged villagers are entitled.—It has been seen that the privileged villager in Bahraich is entitled to all the timber that he may require for his own household purposes. On the other hand, he is limited both as to the dimensions of the trees that he can claim, and the species to which these trees may belong. He is not to be allowed anything larger than a pole, although, strange enough, no attempt has been made to define by actual measurement what is here meant by a pole. For certain purposes, however, such as for the construction of wells and the manufacture of sugar presses and other implements, the privileged villager is allowed trees of large dimensions.

Hitherto we have classed as poles in this district trees below 3½ feet in middle girth. The species to which the privileged villager is entitled include all with the exception of sál, shisham, tún, and huldú. As we have no tún, and but little shisham, he may be said to have a right to all species but sál and huldú. There is, however, an exception even here, because he is allowed dry sál trees of large dimensions for the construction of wells and bridges; and again, the "Tharoos," a peculiar tribe that has emigrated into the district from Nepal, is allowed dry sál poles (in season) for house-building purposes. I have placed 'in season' within brackets, because here again there has been no attempt to define precisely what quantity of this material should be ordinarily given to these people.

Number of privileged villages within the district, and value of the material annually supplied to them.—The number of villages that we have to supply as above is no less than 357, which is quite exclusive of the "purwas," or sub-villages and hamlets. The quantity of timber supplied during the year 1883-84 amounted to 400,000 cubic feet, and the value of the whole material to Rs. 48,000.

Capacity of the forests for yielding this annual supply.—We have seen that the area of forest capable of yielding anything at all in the shape of timber aggregates 225 square miles, of which only about 100 square miles can be pronounced sufficiently good forest to be able to supply the villagers with all these poles without injury to itself. I am afraid indeed that this good forest is nearer 80 square miles than the figure given above. It must be borne in mind here, however, that the excellence of the forest and its capacity for yield does not influence the demand upon it on the part of the privileged populations. The forests of Bahraich

are not compact. They are distributed in a long narrow line of a hundred miles or more along the Nepal frontier. They are not collected into one whole, but form six very isolated groups, all of which are more or less surrounded by a densely packed population. Unfortunately also, the poorest forests are those which are burdened with the heaviest demand, a demand of an annual and incessant character that has to be acceded to whether the forests are injured by it or not. The people must be supplied is the cry, *pereant silvæ, non populus.* The people in question being the inhabitants of a confined zone extending to a distance of three miles from the forests. It is perhaps surprising that these 357 villages, with their outlying hamlets and secondary villages, should consume so much every year. It must be borne in mind that each villager's house is burnt down on an average every four years, and that all the timber supplied to him can, therefore, only last that period. It is possible that if he had to pay for his timber the later would last him longer. Again, the quantity of material used by him for sheds, "machâns," and fencing purposes, is eaten up by white ants within the twelve months, and becomes hence an annual demand.

No proper restriction or control of the material removed by privileged villagers.—Again, no great attempt has been hitherto made to control the produce removed by the villagers. It is true that they can remove nothing without a permit, but then the difficulty is to know whether the person is a privileged villager or not. On the other hand, with the fear of well-founded discontent ever before us, and our desire to conciliate the people, we have given the privileged villager what he has asked us for, without any definite knowledge of the villager's requirements, and without any sanction for placing the demand of any one village on an immovable basis, we could not well do otherwise. It is quite possible that the privileged villager occasionally disposes of his material to outsiders. It is almost certain that non-privileged villages obtain supplies under cover of their alleged privileged character. It is hoped that many of these evils will disappear with the preparation of the village charters already referred to.

Damage done to the forests by the irregulated fellings of the privileged villagers.—The limitation in the dimensions of the trees to be given to privileged villagers was apparently made to suit as much the requirements of the latter as the taste for economy on the part of the giver. In the case of trees of a larger girth, the villager would be put to the expense of converting the log, as also to the greater cost of carrying it away. On the part of Government it was probably assumed that all these poles could have little or no intrinsic value, that their removal would even benefit the forest at large. Inferior species would, in this way, be weeded out, and the young trees of higher estimation be thinned where growing in too great numbers together. This

is certainly one side of the medal; but I shall now show that other side with which I, as an officer seeking to improve my forests and to protect them from injury, am necessarily most familiar with. In the first place, a very large area of our Bahraich forests, notably so the Bhinga and Sohelwa forests, is already so open and deteriorated, that hardly a pole of any kind can be removed from off it without detriment to the forest. Far from inviting thinnings and weedings, we here welcome the presence of thorns and brambles and other undergrowths, anything in fact which will hide the ground from the sun. And it is in such localities that I am obliged to let the privileged villager cut and fell! In the second place, the privileged villager does not thin. On the contrary, if he is fortunate enough to meet with a dozen suitable poles growing together, he will cut down the whole lot to the manifest injury of the forest. Again, we cannot expect of him to spare an entirely isolated tree. He never does spare one, not by any chance, unless it happens to be crooked. It may be said that we should watch over the villagers while in the forest, show them what to fell, mark the trees for them. As an alternative, it might be proposed that we should supply the poles ourselves. All this is quite impossible in practice. Where is the trained establishment to select and mark the tens of thousands of poles required by the villagers? If we did mark them they would not approve of them. Again, under existing arrangements, the villagers are allowed to come for timber and other produce at all seasons of the year, during all the days of the week. We are not allowed to interfere with them in any way whatever so long as they commit no offence that can come within the cognizance of the law. One of their most favourite indulgences is to fell their poles at a height of from 2 to 6 feet from the ground, by which means, of course, the possibility of a good coppice shoot taking the place of the original tree is considerably jeopardised. It is quite comprehensible that they should have strong objections to going any distance to procure their forest supplies, the effect of which is that the nearer the locality is to their homes the more injuriously is it felled over.

The damage committed by privileged villagers could be considerably lessened if they were confined to the less common and less gregarious species met with in our forests.—The damage done by these people would be considerably minimized if we did not permit them to fell in a forest those species which go to constitute the principal element in the stock. By such means as these we, to some extent, force the villagers to extend their operations. They can no longer conduct those unscientific thinnings which are just now playing havoc with certain parts of the Bahraich forests. They have to confine themselves to pure weeding. As an instance, many parts of the Bhinga forest are covered with a pure stock of ebony poles, while similar tracts

in the Sohelwa forest are stocked with a pure forest of dháo poles. It is there that the villager does most harm; it is here that he thins in village fashion, and denudes the ground.

Formerly the privileged villager was not allowed either ebony, dhao, or asna (*Terminalia tomentosa*). He did not then do so much damage. One of the inconveniences of having conceded to him these three species is that he now neglects to weed out any thing else, bringing all his energy to bear on these three, with the consequences already described.

The privileges require revision and modification before being finally laid down in the form of Rubakárs or charters.—It is evident to me that the nature of the privileges conceded by us to the villagers should be subject to important alterations, or at least modifications, before being authoritatively granted to them in a form which we could then no longer withdraw. I refer to the proposed village charters. They should only be allowed poles of such species which did not constitute a part of the dominant stock on the ground, so as to ensure their operations being entirely restricted to fellings that partake of the character of weeding.

The Forest officer should have more extended powers to deal with the privileged villagers.—The Forest officer should have full power to determine for each forest—

(*a*). The species to be felled by them.
(*b*). The localities in which they might alone fell.
(*c*). The fashion in which they should fell.
(*d*). The dimensions of the trees which they should alone fell.

In certain forests it might be necessary to forbid the cutting of poles altogether, and to give mature trees only.

The unfortunate consequence of these fellings being confined to poles is that all the fine straight-growing young trees are removed, while all the diseased and misshapen ones are left behind. Where is the future stock of mature trees to proceed from?

Obligations conferred on the villagers by the nature of the privileges accorded to them.—It may be well asked now what Government has demanded from this privileged population in return for the very valuable concessions made to it. It might have been anticipated that the villagers would not thus be allowed to help themselves, so-to-say, with timber and other produce, or even to graze their cattle within the State reserves, without undertaking in the most distinct manner, and under pain of well defined penalties, to submit to all those regulations that the Forest officer might consider essential to the proper management and working of his forests, and which did not interfere with the supply of their own requirements. But, strange to say, the villagers are not bound down to do anything of the kind.

No obligation to abide by the Forest officer's regulations.—The Forest officer is compelled to supply these people, but he has no legal claim for redress when the latter omit to abide by his

regulations, disobey his orders, cut where they ought not to, overfell in certain localities, and wastefully use the timber supplied to them.

Difficulty of keeping the cattle out of the closed tracts.—One of the greatest difficulties that we have to contend with is the exclusion of cattle from the closed portions of our reserves. And yet this should, in season, be no difficult matter at all; neither would it be so if Government had taken the precaution to insist that only cattle attended by herdsmen should be allowed into the State forests. It is past understanding that people should be allowed to act in our forests as they would, in this respect, not be allowed for a moment to act outside them. It is all very well to say that we have the power to pound these cattle, but the difficulty is to catch them, and when caught, to successfully conduct them all the way to the pound. This difficulty is so great that owners of cattle have been hitherto in no way intimidated by such pound fees as they have occasionally had to pay.

Throughout the great Bhinga forest the cattle find their own way to the forest and back again. Very many of them ultimately run wild. In this way there are large herds of ownerless cattle within our forests. We cannot catch these cattle without having recourse to expensive khedda operations, and we cannot shoot them without hurting the feelings of the people. The whole question shows how the herds of the villagers have been permitted—thanks to no restraint in the shape of a reasonable tax—to increase beyond the control, and beyond the requirements, of the villagers themselves, a fact patent to anybody who will go to the trouble of counting the numbers of maimed, diseased, superannuated, and otherwise useless animals, which are met with in every large herd of cattle, and for which we have, of course, to provide. No doubt one of the motives which urge the villagers to send their cattle into the forest unattended is to escape paying the dues—trifling as they are. There is then nobody on the spot of whom to enquire whether these cattle have been paid for; and then it is a cheerful thought to the privileged villager that, if his cows do wander into the rich pastures of the closed blocks, he is not there to encourage them. If he had been there, he might have been caught, while his cows are quite capable of taking care of themselves in this respect.

Obligation to assist the Forest officer in keeping out fires.—The only obligation under which the privileged villagers are is to assist in putting out fires when called upon to do so. They are bound to assist under pain of having their privileges withdrawn from them. It is only appropriate that this free assistance should be given towards the protection of that granary on which the villagers are dependent for their supplies; and if their services were willingly tendered in this respect we should not have

so much occasion to regret all that we have yielded to them. Unfortunately this is not the case. Of this condition of assistance imposed upon them by Government they are either ignorant, or else, from long immunity, they have come to consider it as having not been seriously intended. I do not think that this should be the position of affairs under an administration which taught the people, by its own attitude in regard to forest protection, how important it considered this part of our system to be. There can be no doubt that in Bahraich, as in so many of our forest districts, the people are incredulous as to their being any true sympathy on the part of the Magistrate for the objects aimed at by the Forest officer. And so long as the people believe in this supposed antagonism, so long will they grudge their assistance to the Forest officer. Forest conservancy is, of course, not a popular branch of our administration, and we can hardly hope to see the people with us when they, in heart, believe their lord and master to be imbued with the same spirit of distrust in regard to our proceedings. This state of things probably accompanies the first stages of forest protection in every part of the world, because there is much in the system which must, at first sight, appear somewhat harsh and uncompromising to those who have not had the time to study it more intimately. All that we can demand, under these circumstances, is that the unprofessional man in authority should give the Forest officer the credit of knowing his own work best, and that, when in a position to further the legitimate aims of the latter, he should not allow his undoubted duty to be warped and narrowed in effect by his possession of views on the subject which he knows are not the views of the Government which employs him.

E. P. DANSEY.

NOTES ON SOME PLANTS AND BIRDS FOUND IN THE HILL FORESTS OF SOUTH-EAST KUMAUN.

THESE forests, situated close to the Nepalese frontier, and forming the limit of the North-West Himalayas to the eastwards, are of special botanical interest.

They consist chiefly of sál and sain with a variable proportion of other trees, such as dhaura (*Anogeissus latifolia*), sandhan (*Ougeinia dalbergioides*), kat bhilawa (*Buchanania latifolia*), bhilawa (*Semecarpus Anacardium*), gosam (*Schleichera trijuga*), rauni (*Mallotus phillipinensis*), dhaula (*Phyllanthus Emblica*), *Phyllanthus nepalensis*, several *Grewias* and *Bauhinias*, whilst huldú (*Adina cordifolia*) is plentiful at the foot of the hills and finds a ready market. Shisham (*Dalbergia Sissoo*) occupies the silt deposits in the river beds together with khair (*Acacia Catechu*), which also occurs here and there on the hill-sides, whilst chir (*Pinus longifolia*) covers the higher ridges.

Sál, however, almost always predominates, but appears to

grow more slowly than in the forests outside the hills. The trees have not the same vigorous appearance, and are, as a rule, crooked and somewhat stunted, the average height being about 70 feet; many are also unsound. Mr. Brandis in his suggestions of 1881 remarks that "the slopes with a northerly aspect are mostly moist and shady, so much so as to affect injuriously the growth of young sál. In a plot numbered 47, and extending from the Nindhaur river nearly half way up the ridge, which I examined on the 7th March, I found a large number of seedlings of sál, with last rains' leaves and the whole shoot above ground killed, not by frost or other injury, but apparently by an excess of moisture. It is probable that these plants will shoot up again, and that eventually they will grow into seedlings; but the general appearance of young sál on that slope showed that the conditions for the natural reproduction of that tree were less favorable than on the warmer and drier slopes with a southerly aspect." This certainly seems to be the case in the Upper Kalaunia forests, at an elevation of from 1500 to 3000 feet, where the reproduction of sál is, as a rule, very good on southern slopes, whilst frequently insufficient on the northern ones.

The following tables give the number of trees of different diameter classes of sál, sain, shisham, khair, and chir per acre in two blocks, Sarra South and Sarra North, occupying the upper basin of the Kalaunia. The former block with an area of 3,000 acres has generally a northern, the latter with an area of 4,500 acres generally a southern, aspect.

The tables show that the northern aspect is not always the most favorable, and that other factors beside aspect, such as excess of moisture, soil, and the configuration of the ground, here play an important part. It must also be mentioned that the comparison is more unfavorable to the northern slope than appears at first sight, owing to the fact that the proportion of chir is greater, and the elevation of certain points somewhat higher than in the other block.

Sarra South.

Name.	Diameter.				Total.
	6—12 inches.	12—18 inches.	18—24 inches.	over 24 inches.	
Sál, ...	6·7	4·3	2·2	1·3	14·5
Sain, ...	2·1	1·5	·8	·5	4·9
Sissú, ...	·2	·1	...	...	·3
Khair, ...	1·7	·1	...	...	1·8
Chir, ...	1·4	1·6	1·2	·6	4·8
Total, ...	12·1	7·6	4·2	2·4	26·3

Sarra North.

Name.	Diameter.				Total.
	6—12 inches.	12—18 inches.	18—24 inches.	over 24 inches.	
Sál, ...	23·3	9·5	3·3	1·5	37·6
Sain, ...	1·7	1	·6	·6	3·9
Sissú, ...	...	...	...	...	·1
Khair, ...	...	...	...	...	1
Chir, ...	·4	·3	·1	...	·8
Total, ...	25·4	10·8	4·0	2·1	43·4

From the above it will be seen that in Sarra North there are more than thrice as many sál per acre of 6 to 12 inches in diameter, and more than twice as many sál of 12 to 18 inches in diameter as there are per acre in Sarra South, whilst in the last diameter class, including trees over 24 inches, the proportion is almost the same. The sain has not varied so much, but there is on the whole one tree per acre more in Sarra South than in Sarra North. The grand total shows that as regards the species counted Sarra North is nearly twice as well stocked as Sarra South, and if all the other trees had been included this result would not probably have been seriously impaired.

The bamboos in both the blocks are very fine and abundant in places. There is a large export. The wild date palm (*Phœnix sylvestris*) is a marked feature of the undergrowth. The inner portion of the short stem is eaten by the Kumaunis, and porcupines seem very fond of it. *Indigofera* was also common, and *Reinwardtia trigyna* conspicuous by its yellow flowers.

The great moisture in Sarra South is indicated by the greater abundance of epiphytical orchids and of climbing arums than in the forests to the west, whilst in some of the very shady damp ravines a curious fleshy *Asclepiadaceous* plant, with slender follicles over a foot long, perhaps *Hoya arnottiana*, was not rare. Besides the associates of sál mentioned above, harra (*Terminalia Chebula*) is frequent, but only as a small low tree, very different from the fine trees of the same species in Burmah and on the Satpuras.

Hymenodictyon excelsum was conspicuous by its white bracts fluttering in the gentlest breeze, *Antidesma diandrum* by its red, and *Osyris arborea* by its orange, berries.

Only two trees of *Bischoffia javanica* were observed, both laden with fruit, which seemed a favorite with the green pigeons.

Alstonia scholaris with its leaves in whorls of 5 to 7 was rare, *Marsdenia tenacissima* not uncommon. The *Myrsineæ* were well

represented by *Mœsa argentea*, *Myrsine semiserrata* and *Embelia robusta*.

The jaman (*Eugenia Jambolana*) was common along the banks of shady streams, and another *Eugenia* species unknown, with handsome broad shining coriaceous leaves, was found in the Dula Gad.

Acacia lenticularis was fairly plentiful in some localities. Its legumes resemble those of an *Albizzia*.

A grove of *Citrus medica* surrounding a marsh, the shrubs being laden with large limes, was discovered at Durga Pipal, and seemed undoubtedly wild.

Small trees of *Sarauja nepalensis* were not uncommon with panicles of pink flowers (in February). For an account of the various seasons given for the flowering of this tree, *vide* Mr. Duthie's article on North-East Kumaun in the *Indian Forester* for January last.

But the botany of South-East Kumaun is of especial interest, owing to the number of plants which here find their westward limit, such as :—

Heynea trijuga.
Piptadenia oudhensis.
Heptapleurum venulosum.
Hyptianthera stricta.
Mœsa argentea.
Bassia butyracea.
Symplocos racemosa.
Schrebera swietenioides.
Thunbergia coccinea.
Ficus pubigera.

Heynea trijuga was conspicuous in February by its round red capsules resembling small cherries. Only small specimens were observed of 2 to 3 feet in girth. Neither Hooker nor Brandis mention this as being found in Kumaun, but both state that it occurs from Nipal eastwards.

Heptapleurum venulosum was very abundant and showy with its flowers in large paniculate umbels.

Hyptianthera stricta, said by Hooker and Brandis to occur from Oudh eastwards, was here found abundantly as a shrub by the side of small shady streams associated with *Mœsa argentea*, the latter being easily recognised by its small white berries.

Bassia butyracea was tolerably abundant, and its white succulent flowers possessing something of the taste and smell of the mohwa (*Bassia latifolia*) seemed to be much appreciated by both birds and insects. Mr. Brandis in his Flora states that a soft solid vegetable butter is extracted from its seeds which does not melt in the plains. Ghee is adulterated with it in Kumaun, but as the tree was only in flower none of the seeds could be procured.

Symplocos racemosa was pretty common. It is stated by

Hooker to occur throughout North-Eastern India from Kumaun to Pegu.

Schrebera swietenioides, which is only known in the Sub-Himalayan tract from this locality, was met with on two occasions on southerly slopes. Its wood is said to have some of the properties of boxwood.

Thunbergia coccinea, a large climber, frequent, according to Hooker, from Kumaun to Bhotan, was conspicuous in damp places by its lax pendent racemes of red flowers.

Ficus pubigera, was not uncommon. It extends eastwards to the Khasia hills.

Many of the birds are very beautiful, and a slight acquaintance with them would do much to lessen the monotony of a forester's existence.

Along the streams live several kingfishers, the commonest perhaps being the white-breasted kingfisher, whilst in well-shaded secluded nooks, where the water is stagnant or runs slowly, sits the lovely brown-headed kingfisher with his bill blood-red, his body buff-colored, his back a bright azure blue, and his wings bluish-green, but the king of them all is the large crested black and white kingfisher watching for his prey from a fixed perch, not hovering over the water hawk-fashion, like his small relation in the plains.

On a rock, in the midst of a roaring torrent, feeding on the larvæ of water-insects, may often be seen the yellow-billed whistling thrush, which at a distance resembles an ordinary blackbird, but on a closer examination is found to have each feather streaked with shining cobalt blue. On being disturbed he flies off with a loud musical whistle.

By waterfalls, climbing up the wet and slippery rocks with wonderful agility and busily feeding on the various aquatic insects and larvæ found at the edge of the water left behind by a wave, may be spied the plain little plumbeous water-robin, or perhaps that prettiest of all the wagtails, the spotted fork-tail, engaged on the same business. The handsome white-capped redstart so called, although only the male possesses the white cap, picks up a living in like manner, but prefers the quieter parts of the streams to the rapids.

Along the more level and shingly portions of the rivers the pretty and delicate grey and yellow wagtail and the common sandpiper, may be seen, whilst amongst the plovers that well-known and wily bird the red-wattled lapwing, which seems to perform the duties of sentinel for all the rest of the animal kingdom, with its oft-heard warning cry on the approach of danger of "Pity to do it," "Pity to do it," is everywhere. After some heavy rain two other plovers were also observed feeding in the freshly deposited mud, *viz.*, the spur-winged lapwing constantly jerking its head in the oddest manner as if it wished to fight, and the stone plover, which is also found in England.

Some sportsmen call the latter the goggle-eyed plover on account of its large yellow owl-like eyes, or sometimes the jungle-hare, from its habit of flying a little distance and then running and hiding itself squatting very close. Outside the forest in the Kumaun Terai, in open uncultivated land, the Indian courier plover was almost everywhere running about, rapidly nodding its head as if it had a stiff-neck which it wanted to set right.

Flitting about hunting for spiders and beetles on rocks and perpendicular cliffs along the rivers, with the fine red patch on its wings displayed to full advantage, may be seen one of the tenuirostres, the red-winged wall-creeper.

The birds which thrust themselves most on one's attention in the forest are undoubtedly those noisiest of all imaginable birds the babblers. The worst of them all is the white-crested laughing thrush, which goes about in large flocks of 20 or more, every now and then bursting into a chorus of most discordant laughter quite startling at first, not perhaps quite so objectionable is the white-throated laughing thrush, and then in the third place comes the well-known Bengal babbler, commonly called the sat-bhai.

One cannot also fail to be attracted by the constant tapping going on all around the camp by the woodpeckers *et hoc genus omne*.

The following were common :—

The Himalayan tree-creeper.
The Indian spotted woodpecker.
The golden-backed „
The scaly-bellied green „
The Bengal rufous „

The latter is supposed not to be found west of Kumáun.

The noisy and gregarious slaty-headed parrakeets were plentiful, the great and the common grey hornbills were met occasionally. Of the former Jerdon says that the noise of its wings can be heard from a mile distant. It breeds in holes in large trees, and the male is said to build the female in by covering the hole in the tree, where she incubates, with mud, leaving only room for her bill to protrude and receive food from his.

Bulbuls were plentiful, the commonest being the white-cheeked crested bulbul and the common Bengal bulbul, whilst the black-crested yellow bulbul occurred in places only, and the Himalayan black bulbul was only seen feeding on the flowers of *Bassia butyracea* in company with the black-headed sibia.

Amongst pigeons and doves the spotted and the common ring doves were innumerable near cultivation, but the beautiful bronze-winged dove was only observed in one locality. Blue rock pigeons had taken possession of some of the cliffs, and the green pigeons were enjoying themselves feeding on wild figs and other fruit.

Amongst game birds the jungle fowl, the kalij, the black

partridge and the bush quail were plentiful, the peacock less so.

The common Indian magpie was everywhere, and seemed as wary as its European cousin, but the handsome red-billed blue magpie, with a tail 18 inches long, was only observed in one spot.

The brilliant little scarlet short-billed minivet, with his yellow robed wife, was not common, neither was the Himalayan red honey-sucker, a glorious little creature like a humming bird, with its head a dark shiny metallic green glossed with purple, its back dark-red, and its rump bright yellow.

A single specimen of that curious bird the large green-billed malkoha was obtained. Its bill is a bright apple-green, a rare color for a bird's bill. A Maronne oriole was also shot. It does not at all resemble the common Indian oriole, its head and wings being black the rest glistening maroon-red. It is said to be found only in the Eastern Himalayas extending east to Tennasserim.

The rufous-backed shrike was to be seen everywhere. Its character is very well drawn by Eha in "Tribes on my Frontier." The large cuckoo shrike was much rarer, and the ashy swallow shrike was only found in one place, but there it occurred in large flocks.

The restless little white-throated fantail was often noticed hopping about large trees catching small flies in the air, and constantly spreading and raising its large fan-shaped tail.

When a forest fire occurs, the Jay-like Indian rollers will be observed making their way towards the scene of the conflagration from all sides, and taking up their posts on advantageous trees, from which they sally forth to catch the numerous insects, &c., which are trying to escape; then appear the king-crows hovering about in the air devouring choice morsels, and lastly following in the wake of the flames come those neat respectable birds, as Eha calls them, the mynas, who pick up all the cooked larvæ, &c., they find on the ground.

Sambhar with magnificent horns abound in parts, but we have no time to discuss the pleasures of the chase. With such a flora and fauna, including a fair amount of game, no forester should be able to say with his brother officer the policeman, that "his life is not a happy one."

JARUL TIMBER.

THE June Number of the *Indian Forester* contains a report on experiments made on the Northern Bengal State Railway with sleepers made from certain Assam timbers,—among them Járul, *Lagerstræmia Flos-Reginæ*,—from which it appears that, after 5 years use in an unballasted siding, where of course white ants and damp would get fair play, out of 100 Járul sleepers

48 were found to be in good and 11 in fair condition. And in the first article in the same number of the *Indian Forester* it is noted that attempts are being made to grow Járul in Assam. Having had some experience at Akyab of the timber called *Járul* by the Bengalees there, and *Pyémma* (not, I think, *Pymma* as Gamble has it) by the Burmese, I am puzzled how to reconcile that with the account given by Gamble of its qualities, and with what is now reported of the experimental *Járul* sleepers.

When I took over charge of the Arakan (P. W. D.) Division in 1867, a large jetty was being finished, of which the piles were all either ironwood, *Xylia dolabriformis*, *Pynkado*, Burmese, or so-called *Járul*. The piles were whole trees, unsquared, and the largest were over 50 feet in length and up to nearly 3 feet in diameter at the butt. The Járul piles were all brought from up the Koladyne River, and they were I think of two kinds, known as red and white *Járul*.

The white Járul was I believe the same wood that was used extensively in Akyab for beams and planks in house-building, as being much cheaper than ironwood or teak, but it was notoriously a favorite food of white ants. It had a grain like ash, and was of about the same color. Gamble says that Járul (*L. Reginæ*) is the most valuable timber of Sylhet, Cachar and Chittagong, and in Burma the most valuable after teak, but he describes the wood as being light red. Not having had any thing to do with the procuring of the piles for the jetty, I cannot say positively that either the white or the red wood, called *Járul* at Akyab, was the produce of *Lagerstrœmia Flos-Reginæ*, but I think there were specimens of that tree at Akyab, and that I was told it was *Járul*. And I have seen the *Lagerstrœmia* in Pegu, and heard it called *Járul* and *Pyémma*. At this distance of time, having left Burma in 1870, I cannot recollect having seen the red *Járul* in general use, except for the paddles of canoes, for which it was admirably adapted. The color and grain were like a darkish mahogany.

While at Akyab I had to substitute ironwood for white *Járul* beams in the roof and floor of the Treasury. The earth oil with which the beams had originally been smeared had lost its virtue, and the white ants had got in. After an interval of leave and other duty I again received charge of the Arakan Division towards the end of 1869, and was surprised to find the T head of the jetty in already extensively in need of repair. The *Járul* piles, braces and walings were rotting, and the pile heads were being eaten up by white ants, though they stood fully 500 feet from the shore at high water! The decay extended to low water mark, but below that the Járul timber seemed to be quite sound. The destruction by white ants stopped at high water mark. It had before become known during the construction of the jetty that whereas the *Teredo navalis* freely fed on, or bored through,

ironwood, it rejected *Járul* as being unpalatable or unwholesome, and then, if I recollect rightly, the natives said they knew that *Járul* did not stand exposure to the weather, or being alternately wet and dry, as were the piles and timbers down to low water mark. The timber of the jetty of both sorts had been carefully sheathed with tarred felt and Muntz metal, as protection from the *Teredo*, but in the case of the *Járul* this proved the means by which the white ants were enabled to effect the destruction of the pile-heads. At that distance from the shore it was of course a puzzle, first, whence came the white ants, and, second, whence they got the earth with which they make the galleries without which they cannot, or do not, like to work. There is no doubt that the white ants came from Calcutta or Chittagong, and were landed from the mail steamers, for the use of which chiefly the jetty was built. The cargo was stored in a closed shed on the T head of the jetty until sent for by the consignees. Even ships themselves are sometimes damaged by white ants. In 1865, I think, the Lighthouse schooner "Alguada" was found to be nearly eaten up by them, but where the earthy medium came from in that case I did not hear. Perhaps those interesting little creatures were then made innocent scapegoats, as in the celebrated case in which rupees were said to have been eaten by them. But in the case of the Járul piles there was no mistake, and I got literally to the bottom of it. When making a survey of the damage done I stripped off the felt and metal sheathing, and found that the ants had worked their way down inside or through the felt to considerably below high water mark. This of course they did while the tide was low, and there they found the earth they were in quest of, in the shape of silt, deposited from the muddy water of the Koladyne estuary! I saw them going down and up, and they were not there eating the timber. The galleries the ants had made through and through the pile heads above high water mark were as usual lined or filled with earth. I estimated for cutting off all the Járul piles down to low-water mark; and putting ironwood heads (ironwood, or *pynkado*, withstands white ants and weather) on them, but the Arakan Division was abolished, and I was transferred to Bengal before this was sanctioned, and do not know what ultimately was done. I believe, however, that the timber jetty continued to go to grief, and that it has been replaced or superseded by an iron one. I cannot recollect whether I found any *red Járul* on the pier-head thus rotten or ant-eaten, but I am under the belief that both red and white timber was used in the work.

What then was this white Járul, that withstood the teredo but was so easy a victim to the termite, and that was durable (for some years at least) under salt water, but unable to resist the weather? Was it a *Lagerstræmia* at all? Gamble does not say whether the *Lagerstræmia Reginæ*, which has a red wood,

resists white ants. I hope that some fellow subscriber, if not the Editor, will be able to clear up this point for me, and to give some further particulars as to the merits and demerits of the red and white *Járuls*.

C. W. HOPE.

MUSSOORIE,
18th June, 1885.

DIMENSIONS OF A TEAK TREE.

Dimensions of a teak tree sown at the Kulsi plantation, Kamrúp, Assam, in 1874. Cut down in 1885. Age 11 years, annual rings 11.

No. of section.	Length.	Girths.			¼ mean girth.	Cubic contents.			Remarks.
		1	2	Mean.					
	ft.	ft. in.	ft. in.	ft. in.	in.	′	″	‴	
1	14	2 -9	2 -3¼	2 -6	7½	5	5	7	By Hoppus' measurer.
2	12	2 -3¼	1-10¼	2 -1	6¼	3	3	..	Total height, 67 feet.
3	12	1-10¼	1 -5¼	1 -7¾	4¾	1	10	6	The first girth was taken at butt, and the last at 50 feet.
4	12	1 -5¼	1 -1¾	1 -2½	3½	1	..	3	
Totals,	50	..	..	..	..	11	7	4	

The tree has thus grown at the rate of 1 cubic foot per annum, and the heartwood at the butt covers five annual zones.

A. J. MEIN.

THE BAGNERIS MEMORIAL.

THE object of the Bagneris Memorial Fund having been now finally settled, some account of what has been done will interest the readers of the *Indian Forester*.

The scheme has not been so well supported as might have been expected, but 31 officers have subscribed Rs. 1,170, which

has enabled us to carry out our plans more fully, than was at one time expected.

Various suggestions were made and discussed with regard to the form of the memorial, and it was at first intended to place a bust of M. Bagneris in the Nancy Museum, but this idea was eventually abandoned.

First, because M. Puton, the Director of the School, thought the scheme too ambitious, and *secondly*, as the funds subscribed were not sufficient to enable this to be done, the cost of a bust being estimated at not less than Rs. 1,500.

After some delay it was finally decided that the memorial should take the form of a marble medallion, and Colonel Pearson and M. Boppe kindly undertook to negotiate with a rising young artist of Nancy, named M. Benoit Godet, who, every one admits, has done full justice to the work entrusted to him.

The medallion is of white marble in relief, surrounded by a massive carved teak frame, the wood for which was forwarded from Burma by Mr. Aplin ; the size of the medallion and its frame is about 4′ × 4′, and all who have seen the original pronounce it to be a real work of art. A large photograph of the medallion was sent to me by Colonel Pearson, and from it I had reduced copies taken, which have been sent to the subscribers in order that they may judge for themselves of the merits of the work.

The completion of the medallion and the construction of the frame naturally took some time, and it was not till March 1885, that it was finally completed, and made over to the Director of the Forest School by Major Bailey, who kindly undertook all arrangements after the departure of Colonel Pearson from Nancy.

There having been a small balance over after paying the artist and defraying all other charges, in connection with the memorial proper, it was decided to place an album of Indian workmanship in the Nancy library, which will, eventually I hope, contain the photographs of all Indian Forest officers who were pupils of M. Bagneris, or who have received instruction at Nancy.

A very handsome inlaid sandal-wood album case has therefore been purchased for Rs. 45, and was forwarded to Major Bailey, who has arranged to have it fitted up and provided with an outer teak case, and he has now placed it in the library of the Nancy Forest School.

Eighteen photographs of former students have been received and forwarded to Major Bailey, and it is hoped that those who have not yet sent theirs will kindly do so either to me, or to Major Bailey at Nancy, as soon as possible.

I almost omitted to mention that the artist who executed the work, kindly offered a number of reduced clay moulds of the

medallion to Major Bailey, who has disposed of them in the following manner :—

1 to M. Bagneris' family at Nancy,
1 to the India Office,
1 to Colonel Pearson,
1 to the Inspector General of Forests in India,
1 to the Dehra Dún Forest School,
1 to myself,

The models for distribution in this country have been sent free of charge through the India Office, but have not yet come to hand.

I have received the following letter from M. Puton, Director of the Forest School, in recognition of the presentation of the Bagneris medallion to the Ecole Forestière at Nancy :—

Nanci, le 10 Mars, 1885.

Mon cher Camarade,

Je viens vous exprimer toute ma reconnaissance du touchant souvenir que les anciens éléves anglais ont, sous vos inspirations, envoyé á l'Ecole.

J'ai fait installer le médaillon du professeur Bagneris, avec son bel entourage en bois de teck, dans la plus grande salle des collections, et à la plus belle place. Soyez bien persuadé que, cette place est fort minime á coté de celle que tous les professeurs, les éléves français et moi, nous vous gardons dans nos cœurs et nos affections.

Tous ici me chargent de vous exprimer leurs sentiments de gratitude et d'amitié. Je le fais, croyez le bien, avec un réel plaisir, et je vous prie de vouloir bien transmettre aux anciens éléves anglais, nos dévoués camarades, avec mes sentiments personels, l'expression de cette unanime reconnaissance et de cette durable affection.

Veuillez agréer,
Mon cher Camarade,
Mes sentiments les plus dévoués,
L'Inspecteur Général des Forêts, Directeur de
l'Ecole Forestière, Compagnon de l'ordre Impérial de l'Inde,

PUTON.

In conclusion, I must not forget to mention that, some time ago I received through Colonel Pearson, from M. Bagneris' family, an expression of sincere thanks to all subscribers, for the unexpected honor which has been bestowed on the memory of their late lamented father.

E. McA. MOIR.

GAMBOGE.

CAN you or any of your readers give me any information concerning the processes for extracting and preparing gamboge?

Near Belin, a small town in Burma, the *Garcinia succifolia*, called in vernacular 'Thanataw,' grows very sparsely, but there is another gum, *Garcinia Cambogia*, called in the vernacular 'Thaungthalé,' which grows rather more extensively near the small town of Sittang.

The inhabitants of these places are perfectly ignorant of the use of the tree, neither do they, after being informed of what value the tree is, understand the processes of working, and unfortunately I am unable to give them any information on the subject.

Of these gums the *Garcinia succifolia* appears to produce the best gamboge, and although the tree is so scarce that the inhabitants state that there is one tree in a certain place, and two trees in another place, they probably would find more if it was made worth their while to look for them, and if they were shown some easy process for the extraction of gamboge.

Seeing is believing with the Burman; he seldom speaks the truth, and does not give any one the credit for doing so, and unless the processes for working are very easy, and are personally shown to him, he will not believe in them, and will not take the trouble to work.

H. B. WARD.*

'AMARI' WOOD.

At the request of Mr. W. H. Bennett I write to inform you that from enquiries made about the "Amari" wood,† a sample of which Mr. Bennett had consigned to him in London, I find that it is a very hard wood, and the wood merchants think too hard to work, but as to the probable value they will not give an opinion, as it appears none of them import direct, but buy from sales at the docks, and they say the best plan will be to send a small quantity to some broker in London and have it sold by public auction, when if sold and found a suitable wood for manufacturing purposes, you would probably have enquiries for more of it.

S. W. MILLAR.

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* We would refer our correspondent to Mr. Mack's paper on Gamboge on page 392 of this Number.—[ED.]

† *Amoora spectabilis* of Assam.

JJ. Reviews.

FOREST ADMINISTRATION REPORTS FOR 1884-85.

(*Continued from page 325*).

We now come to the report of the *North-Western Provinces and Oudh*, and in these the most interesting information is found in that for the Oudh Circle, which 1,132 square miles under five Divisional Officers, making a compact circle which Conservators in other parts of India, who have to travel sometimes enormous distances from one to another of their charges, may well envy.

The question of grazing and of the large number of wretched animals kept by the people is adverted to in Capt. Wood's para. 23, which we reproduce :—

"From the short description of the forests in the introduction of this report, it will have been seen what the area is where legitimate grazing can be carried on. Beyond these limits every head of cattle is doing damage to the extent of many times the dues that are paid. In districts where there are no forests cattle live quite as well as those in villages near the forests. It appears to me that the people keep too many poor wretched cattle and not enough good strong ones; a few good ones could be kept in good condition and bring forth healthy offspring, where double the number would be half-starved and produce puny, weak offspring, which die off in the first unhealthy season. The native will never reduce the number of his own accord, or as long as the grazing dues are merely nominal."

This important subject was first hinted at, we believe, by Mr. Buck, the present Secretary in the Agricultural Department, in his speech before the Society of Arts, and since then several of the Indian newspapers, and most especially the *Pioneer* and the *Madras Mail* have either published articles or letters from correspondents drawing attention to the deterioration of the cattle in India chiefly, as the *Madras Mail* said, because of 'the native prejudice against taking the life of any and especially of more or less sacred animals.' In an able letter published in the *Pioneer* last year, it was said 'it is no use our improving the pastures unless we are at the same time prepared to limit the number of cattle in a permanent manner in each village, and proportionately to the advantages possessed by each village.' We do not propose here to dilate to any length on the subject, though we are much tempted to do so,

and especially because in another article in a South Indian paper, we were told that a Board of Revenue did not consider such matters as 'within the range of practical discussion.' We are glad Capt. Wood has drawn attention to the matter in Oudh, and hope that its more thorough ventilation will lead not only to the forests escaping much of their present damage, but to a great improvement in the quality of the stock, and consequently in the agricultural work done by them. Any unprejudiced person who sees the stony lands and poor fields of much of the Deccan country overrun with large almost useless herds of stunted and starving cattle, searching out every blade of vegetation fit to eat, and trampling the surface soil of the fields into dust to be blown away by the first high wind, must believe that the question of reducing their numbers to sufficient only for real agricultural and domestic purposes is not only one which is capable of being discussed, but is one which, if the apathy of optimist district officers leaves it alone too long, will be extremely difficult to settle in the end, and if not settled may result in clearing the country referred to not only of soil and vegetation, but of the population itself, which will no longer be able to subsist on the land. The warning of even a forest officer, supposed to be always one-sided, is not to be too hurriedly rejected and put aside as not worthy of notice.

The effect of cattle-trampling on the reproduction is described in para. 25, where Capt. Wood most justly remarks that as natural reproduction on clay soils hardened by many years of trampling is almost impossible, there is nothing for it but to loosen the soil artificially and have recourse to expensive planting. His experience of the gradual spread of the sál tree from the forests on to the grass lands where those lands are not swamped accords with our own, and we have even seen it spread on to lands which for a part of the year are under water. We also entirely agree in his view that sál seedlings will not grow under the shade of large trees: they will germinate, but, like the oak, they require to have the cover at once removed to allow of their further growth.

It is good news to hear that the Lucknow Paper Mills are likely to use the bark of the *Bauhinia Vahlii* considerably: with the Oudh forests comparatively close at hand much fibre material ought to be readily made available for the mills, and the many soft-wooded almost useless trees which the forests contain might, we would suggest to the Conservator, be converted into paper stock by some one of the recently discovered easy processes. The utilization of waste products is a very important matter for India, and to Foresters it should take the form of finding a market for the many fibre materials we possess. The barks of nearly all the figs, the *Careya*, *Kydia*, *Sterculia*, &c., and the many small underwood plants of the mallow, *Sterculia*, lime and nettle tribes should easily, as

paper mills are gradually established about the country, and where the cost of carriage is cheap, find a means of being utilized.

The chief work of the year in the Oudh forests was the cutting of over four lakhs of sleepers for various railways, and we are glad to hear that most of the railway officers have been pleased with the sleepers they obtained, and that they have not objected to accept nearly 70,000 of *Terminalia tomentosa* wood. We note that some trees gave 80 sleepers, narrow gauge we presume, from the cubic contents given in the returns, but that the average was ten only per tree, showing that, as elsewhere in India, much of our present stock of mature sál has been damaged at some period of its growth, and that protection and care is necessary to ensure the production of sound timber in the future.

Free grants up to nearly 5,00,000 cubic feet were made during the year, chiefly of poles and saplings of inferior kinds, for native houses in villages near the forests. Surely this amount is too much unless it is given under recorded rights. In concluding our notice of the Oudh work, we may mention that the Conservator is endeavouring to ascertain the value of the dried juice of sál bark, prepared as cutch is prepared, as a tanning material, another instance of Capt. Wood's desire to utilize waste products. We hope next year to hear that he has been successful, and then perhaps the system may be extended to other provinces and to other kinds of trees.

In the Report of the Central Circle we are glad to see that Mr. Greig's testimony is added to that of the Chief Commissioner of the Central Provinces, to be alluded to later on on the superiority of sales from the forest over departmental works, and the importance of encouraging private timber enterprise. The indirect gain to the forests in the staff having more time to attend to protection and improvement cannot fail to produce great results in the future. Already he is able to show that private agency gives a profit of 11 annas 9 pie per cubic foot as against 6 annas 4 pie under the departmental system. We note that attention is drawn to the overcutting of bamboo, and that orders have been given that at least four growing stems shall in future be left in each clump. Much of the damage, not only to bamboo, but still worse to young shoots and saplings, is done by wild elephants, and perhaps Mr. Greig's late Khedda operations may have had a good effect. On the damage thus done, Mr. Greig writes as follows :—

"The amount of damage they do in our forests by eating, breaking, and uprooting bamboos and knocking down sál and other saplings is inconceivable to any one who has not seen it; they are a great nuisance to every one in, and on the borders of, the forests, and Government derives nothing but *loss* from them, and loss to a very considerable amount. Unmolested as they now are and have been for several years past, they breed freely and their numbers have increased

enormously; and if this goes on for a few years more, we may expect a large decrease in our revenue from bamboos, notwithstanding our efforts to stop overcutting, and an increased export of dry sál poles which will not improve the forests of the future."

In the three sample plots constituted in the Kumaun Division, it was found that the average yearly increase of girth was 0·80, 0·83 and 0·89 inches respectively, giving an average of 0·84 inches.

In the School Circle the grazing question has also occupied attention. We should have liked to have seen Major Bailey's draft rules, but they do not appear to have been published, though stated to be so. The main point, however, is said to be that the grazing dues payable by each village shall be fixed for a term of three years, and that free head loads of fallen dead fuel may be granted to all villagers paying grazing dues, while each herdsman will be supplied with a badge showing how many cattle he is allowed to graze.

The results of protecting the Ratmau basin in the Siwaliks is thus described by Mr. Smythies :—

"The result of protecting the Ratmau basin for four years is remarkable, and will be dealt with in a special report. The main results may, however, be given here. The sides and slopes of the hills are now clothed with grass and young seedlings, and the water no longer rushes down, carrying silt with it; the consequence is that the floods in the Raus have been reduced in volume and force, the water channels have become narrower and deeper, and the beds are stocked with grass and thousands of sissú and khair seedlings. The little silt which is washed down together with débris is caught by the grass tufts, and the tendency is for certain banks in the bed of the stream to be raised while the water channels are deepened. This is the result which was anticipated, though it was not expected that four years would make such a difference. As long as fire is kept out of these forests we may be said to have gained complete control over the Ratmau torrent."

We quite agree with him that the experience of four years only is most encouraging. The export of boxwood still continues: 62 trees felled gave 10 tons in logs 41 inches long. The price obtained in England was £19 10*s.* per ton, and the profit made was Rs. 244, or about Rs. 24 per ton. We trust, as we said in reference to the Bengal experimental sales, that they will not be allowed to stop, for markets are not to be secured in a moment.

It is interesting to record an experiment made in ascertaining the loss of weight in stacked fuel in one year. It amounted to 25 per cent. on the amount of green fir wood. In the appendices are also given the results of several experiments on reducing factors and annual growth. Mr. Fisher states that combined with former experiments the reducing factor for spruce is ·50 and for silver fir ·55. The experiments on annual rings gave

about 9 per inch of radius for spruce and 12 per inch for silver fir and deodar.

Turning now to the Lieut.-Governor's review we reproduce his opinion on the grazing question as follows :—

"It has been ascertained that in the Central Circle 1,273 square miles out of 1,691, in the Oudh Circle 800 square miles out of 1,090, and in the School Circle 568 out of 727 are open to grazing. These areas form the pasturage and breeding grounds of three-quarters of a million of cattle, and in all three circles important and complicated questions have risen, which require early settlement. In some parts the issue is whether the grazing can be limited in the interests of the forests, either as to area or as to numbers of cattle, without serious disadvantage to the people; in others, whether the introduction of foreign cattle has not been carried to a point at which the rights of villagers in the neighbourhood of the forests have been considerably encroached upon and injured; in a third series of references the question before Government is whether the existing system of grazing fees may not be materially simplified to the benefit both of agriculturists and the professional graziers of the country. On all these points orders will issue in the course of the Lieut.-Governor's inspection of the forests this winter."

The following is Sir A. Lyall's view of the question of 'departmental agency' *versus* 'private enterprise.'

"When operations have to be carried on on an extended scale for the production of timber of a uniform size and form, the departmental system has its best chance of success, and these are the conditions under which work was prosecuted in the Oudh Circle during the year. For ordinary operations in the forest, however, experience seems to show that the private enterprise system is at once more profitable for the Government and more convenient for the public."

The financial results of the year for the province were :—

	Rs.
Revenue, ...	16,11,383
Expenditure, ...	10,41,884
Surplus, ...	5,69,499

being a great increase in revenue, both *gross* and *net*, on recent years, chiefly due to the large sleeper operations in Oudh.

The *Central Provinces* Report also gives prominence to the question of 'departmental *versus* private agency,' and it is with much pleasure that we reproduce the following remarks of the Chief Commissioner. We should have liked to reproduce Mr. Thompson's also had we space to do so :—

"It appears to him that when private agency and enterprise are forthcoming, which is not always the case, it will be desirable and economical to put a stop to departmental action. Timber is used for numerous purposes, and the need and want of consumers influence and determine the price; Government has few means of knowing the

wants of consumers and oscillations in demand, whereas a timber dealer makes it his business to ascertain and meet them. A timber dealer has also depôts where he can keep his timber and fashion it to the wants of customers till favorable opportunities for sale present themselves, whereas when Government has once felled trees, and converted them into shapes it has to sell them for what they will fetch, or run the risk of loss by theft and fraud.

"The true duties of Government in respect to forests appear to be to preserve them for climatic reasons, and to maintain their productiveness at the highest point in order to provide the community with a continued and steady supply of timber. The distribution and retail sale of timber are beyond the proper functions of Government, and appertain to private enterprise which is better able to appreciate and meet the wants of customers. By the substitution of private agency for departmental action Government seems likely to benefit in two ways, one by restricting its officers to their real functions, which are already sufficiently exacting, the other in getting higher prices for its produce when private enterprize engenders competition."

The unanimity with which Forest officers in most provinces and the Local Governments are coming to the opinions expressed so clearly by Mr. Crosthwaite is most encouraging, and it may be hoped that before many years are out the extension of private enterprise in timber will result in leaving the markets to fix rates for themselves, and the Forest officers to spend their time in the improvement of the valuable estates they manage for Government.

In regard to the grazing in the Central Provinces forests, the general rule is that all forests which are protected from fire are also closed to grazing, except in cases of great necessity, or where little or no present injury is to be expected. Over three million cattle grazed during the year in the Government forests, and the revenue derived from them amounted to nearly four lakhs, or something approaching two annas a head for the year, which cannot be looked upon as a very excessive tax.

We are glad to see it reported that sowings of seed in the forest have been successful, contrary to previous experience in the Central Provinces and elsewhere. The good results appear to be due to the use of drills. At the same time it is interesting also to note that the fire lines in many of the reserves are being planted with evergreen trees, such as mango, mohwa and *Eugenia Jambolana*. These are planted in 3-foot cube pits with basket plants.

A new system has been introduced into climber-cutting work, in order more effectually to kill the stools, *viz.*, beating the cut stem close to the ground level with the axe head, in order to prevent the formation of buds. We fear that though the process may retard the fresh growth it will not prevent it, and that it will be found to appear from underground instead of direct from the stool.

The results of some experiments on the growth of sál in the

Banjar valley forests are here worth recording. Captain Losack found that the age at which sál trees reach 1, 2, 3 and 4 cubits in girth respectively are 33, 57, 77 and 97 years respectively. Roughly then we presume we may take the periods as 30, 60, 80 and 100 years if we fix the rotation at 100.

A new industry was started during the year in the collection and sale of mohwa seed for export from Bombay. We believe most of it goes to Marseilles for the manufacture of oil. An amount of 1,678 maunds was collected, at a cost of Rs. 252, and the lot sold for Rs. 1,250. The difficulty seems to be in the great liability of the seed to damp and damage.

The results of the year were :—

	Rs.
Revenue, ...	9,94,769
Expenditure, ...	4,36,057
Surplus, ...	5,58,712

showing a steady increase.

In the neighbouring province of *Berar* a noticeable point is the Commissioner's recommendation that except in the Melghát the District Forest officers need only be Sub-Assistant Conservators and not members of the superior staff. We are glad to see that the Government of India do not endorse these views, and without expressing any opinion on the possibilities of the future consider that at present such a step would be inadvisable.

There seems to have been little noteworthy during the year, though the results of natural reproduction have been most encouraging and the broadcast sowings of babúl very successful.

The financial results were :—

	Rs.
Revenue, ...	3,08,217
Expenditure, ...	1,56,539
Surplus, ...	1,51,678

We now come to the *Punjab* Report, perhaps the most valuable and interesting of those for the year. There is not very much of general interest which we can quote or describe, but we strongly recommend instead to our readers the perusal of the whole. The common-sense remarks of the Conservator, and the clear and careful way in which they are expressed, render them of much value, and after the long-winded record of trifling details, with which certain other of these reports are filled, were a pleasure to read. We are glad to see that both the Local Government and the Government of India appreciated this as much as we did ourselves.

In his para. 50 the Conservator remarks on the value of Working Plans even of the roughest description, and we strongly

support his views that when working plans of any kind are possible it is better than waiting possibly many years for the chance of plans prepared on strict scientific principles being made. As Mr. Ribbentrop remarks, 'they stand a safeguard against overworking, and to a great extent secure reproduction, which without them might have been neglected.'

It is in treating of natural and artificial reproduction that the greatest amount of interest is found. The value of the *Pinus longifolia* as a good reproducer in spite of fires and grazing is praised, and its value as an agent in preventing erosion by covering the hill-sides with its needles is done justice to. Attention is drawn to the importance of a good series of forest nurseries and a permanent supply of good plants to fill vacancies and plant up blanks, and we agree with Mr. Ribbentrop in his estimate of the importance of this and that areas early denuded for timber works must be the first to take in hand. In para. 131, which though long, we take the liberty of reproducing, is described the work undertaken in the 'reboisement' of the Pabbi Range, the first work of the kind which has been to the best of our knowledge undertaken in India.

"The chief cultural operations carried out during the year in the lower hills have been those in the Pabbi reserve in the Gujránwála Division. Operations were here continued on the north of the railway line over an area of 123 acres, and were carried out under the supervision of Messrs. D'Arcy, Carr and Lace. The main part of the work was completed between the 4th of July and the 18th August. The following is a summary of the work done and expenditure incurred during the year :—

	Rs.
Digging and sowing 550,408 running feet of trench and ridge, ...	901
Seed, ...	507
Transplanting work, &c., ...	162
Bunds, ...	266
Establishment, ...	151
Miscellaneous, ...	259
Total, ...	2,266

"The trench and ridge system was the method of cultivation employed on an even more extended scale than before. Besides trenching the more or less level plateau, endeavours were made to cultivate the steep sides of all the small hills by trenches dug in contour lines. The trenches were again made at 6 feet apart and usually 1 foot cube, but on the slopes, and especially at the foot of all the hills, trenches 2 feet by 2 feet were dug so as to prevent the formation of water rills, which are the beginning of erosion. By means of the above system, *viz.*, trenching the whole area, hills and all, in exact contour lines, the still more expensive work of erecting bunds may be dispensed with, provided that the trenching is done carefully and

exactly; but the trenches must be quite level, or they form a water-course instead of serving for collection of water. Phulai (*Acacia modesta*), kikar (*Acacia arabica*), sissú and jhand (*Prosopis spicigera*) were the chief seeds employed, but the following species were also sown either as a mixture or by way of special experiment: sanattea (*Codonæa viscosa*), chil (*Pinus longifolia*), kher (*Acacia rupestris*), *Prosopis glandulosa*, lahura (*Tecoma undulata*), sirjs (*Albizzia Lebbek*), bamboo, *Celastrus senegalensis*, *Vitex negundo*, *Feronia elephantum*, casuarina and mango.

"The chil seed again was largely carried away by birds, and, the rains being unfavourable, only some of the chil germinated; still, up to the end of April some 300 or 400 healthy looking plants were to be found on the ridges. The other seeds, with the exception of those of *Vitex*, *Feronia*, casuarina and mango, germinated freely. The rains were decidedly unfavourable: a heavy fall took place on the 30th June, this was followed by a heavier one about the middle of July sufficient for the germination of most seeds, and then no rain fell until September. The natural result of this has been that many seedlings which came up in July dried up, and on the whole the plants have not made the same rapid progress that they did in the previous year; a certain amount of seed, however, germinated only in September, and during the spring the young plants improved considerably. A portion of the area had to be re-sown in February, especially as the frost thinned out the kikar in places; but in spite of all the above enumerated mishaps the greater part of the area is now well stocked with an abundance of young trees, the phulái showing itself by far the hardiest species and most sure of succeeding. As usual, all the finest plants grow on the deeper trenches where more water is collected.

"The smallness of the plants throughout is of course a source of danger during the hot weather. 100 phulái plants and 350 eucalyptus, jaman, tallow, weeping willow and poplar were planted in the spring in the ravines and round the Forest bungalow, and they have almost all succeeded so far. A number of chil transplants were also put out in the ravines, but as the weather is getting warmer they are fast drying up.

"In the rains, 100 bamboo plants were put out on the sides of the main ravine, but they all failed. The expenditure incurred on the retaining dams was less than that of the previous year; 292 new bunds were built, and 3,598 repaired, at a total cost of Rs. 266."

The financial results of the year were—

	Rs.
Receipts, ...	9,10,177
Expenditure, ...	6,53,146
Surplus, ...	2,57,031

We will conclude by noticing that we have also received the Progress Report of the Forest Survey Branch. The work of the year was chiefly in Berar in the surveys of the reserved forests and in Garhwál. Mr. Reynolds has been given great credit by

the Surveyor General for his labour-saving arrangements in using a 'traverse indicator,' which we hope he will give an account of in our pages for the benefit of the distant uninitiated.

Note.—We do not agree with our reviewer in a sweeping condemnation of works by Government agency. In the case of accessible forests, where the demand is certain, and large quantities of material of equal dimensions, such as railway sleepers, are in demand, so that supervision is simplified, and the works are necessarily on a large scale involving considerable capital expenditure, we think that Government is quite justified in working the forests itself, and not handing them over to the frequently rough treatment of contractors.

If divisional officers have not time to attend to such works, competent assistants must of course be obtained, and the works should be of sufficient importance to justify the additional expenditure this will involve.

Government timber works have frequently been brought into discredit by the inaccessibility of the forests worked, and by the work being on the small scale, as well as by great want of economy shown by the officers in charge.—[Ed.]

STATE FOREST ADMINISTRATION IN SOUTH AUSTRALIA FOR 1883-84.

We have read carefully the Annual Report upon State Forest Administration in South Australia, but have put it down with considerable disappointment.

Considering the vast area of the Colony, which extends right across Australia from south to north, we should have expected Mr. Brown, the Conservator, to have entered into the question of the reasons why there is no immediate necessity for extending the very meagre area of reserves which at present comprises 150,366 acres, only 30 per cent. of which is under indigenous forest. We should have welcomed an account of the natural forests of the Colony, of their accessibility, and of the demands on them, and the reason why no protection is deemed necessary at present, but Mr. Brown is quite silent on these points, though we presume that vast areas of State forest land are being alienated steadily every year. His report commences with the new by-laws of the forests under his control, which merely fix the rates for different kinds of produce, such as fencing posts, 10*s.* per hundred, rates for cartloads of fuel, for licenses to remove stone, gravel, &c., pasturing cows at 4*s.* a month, &c. These are questions that Mr. Brown or his assistants could surely have settled for themselves, but which have been approved by the Governor in Council and formally published in the Gazette.

We then get an account in a few lines of the revenue and expenditure, the former amounting to £5,455 and the latter to £6,020. Nearly all the revenue, £5,153, is due to pasturage, the sales of timber being only £231, and the remainder, £71, being due to sale of wattle bark. The expenditure comprises—Conservator's salary, £450, Chief Clerk, £250, 2 Foresters at £160 each, the remainder being put down to contingencies and plantations. The travelling expenses of Conservator, purchase of tools, labor, &c., being all included under contingencies, so

that it is impossible to decide on the actual cost of any particular work.

From a general review given of the works done by the Department, we find that only 5,057 acres are closed for planting, the remainder we presume being principally used for grazing. The department has been in existence for about eight years, and the total revenue received is £44,717 against an expenditure of £46,724.

744,000 trees planted out are alive, and 500,000 indigenous saplings have been pruned and trained into the making of good forest trees, which would otherwise have grown into stunted and comparatively worthless trees; 100,000 young trees have sprung up owing to natural regeneration, so that Mr. Brown takes credit to the Department for having added 1,344,000 trees to the property of the Colony.

Besides this, 200,000 trees have been given away, and are said to be adding to the beauty of many a homestead, whilst the nurseries contain 1,000,000 more. 200 acres are under a promising crop of wattles, and it is to wattle bark that Mr. Brown looks hopefully, as an increasing source of revenue.

We have then a long account of the planting operations in each forest, on which most of the energies of the Forest Staff are expended, the list of trees comprising many exotic species, such as *Pinus insignis*, *P. Pinaster*, *P. radiata*, *P. halepensis*, and species of oak, maple, elm, &c. We note *Cupressus torulosa*, and *Melia Azedarach* as Indian species.

Vacant lands along the railway lines are being planted with olives and mulberries. Although a bonus of £2 per acre has been offered, under Mr. Krichauf's "Act to encourage the planting of trees of 1873," only four applications for the bonus have since been received by Government, only one of which was entertained and £136 disbursed.

A number of Indian seeds were received from the Inspector General of Forests, India, and from the Director of the Botanic Gardens, Saháranpur.

There is no order of Government on the report, and it is pretty clear that forestry has hardly yet been started in South Australia, though some interesting experiments in arboriculture are in progress, and Mr. Brown appears to be thoroughly contented with his nurseries and plantations, and has no anxiety about the future timber supply of the Colony, and not a word to say about imports or exports of timber, though we presume that with its enormous sea coast there must be some timber trade in South Australia.

It is however pleasant to note that a Museum of Forestry has been started, and that it is intended to start a wood collection of the exotic trees grown in the Colony, as well as the indigenous timbers and a carefully classified Herbarium of the Flora of South Australia.

The following programme is promised for 1884-85 :—

50,000 pines, 2,000 oaks, 1,000 American maples, 1,000 catalpas, 1,000 other exotics of roots, and 490,000 Australian gums are to be planted out, and 500,000 seedlings to be given away; the wattle plantation is to be extended, and an arboretum is to be planted out at the Agricultural College at Roseworthy, besides some other minor works.

We give the figures of the annual rainfall at Wirrabarra, which is said to be the best experienced since the Forest Department records began—

	Inches.	No. of rainy days.
January, ...	0·15	1
February, ...	1·60	6
March, ...	0·72	5
April, ...	1·94	9
May, ...	7·08	16
June, ...	3·38	12
July, ...	3·83	14
August, ...	4·51	11
September, ...	3·03	13
October, ...	2·07	10
November, ...	1·26	11
December, ...	0·70	8
Total, ...	30·27	116

In spite of this favorable rainfall, much damage to the plants was done by severe frosts, but yet 80 per cent. of the transplants have succeeded, which points to the great care exercised in these works by the foresters.

FUEL TRAMWAY IN MADRAS.

We are glad to learn that sanction has been accorded by the Madras Government to a proposal of the Conservator of Forests, Northern Division, to purchase and lay down one mile and 220 yards of a portable tramway, for the purpose of transporting fuel from Casuarina plantations and the Sriharikot forest to the banks of the Buckingham Canal. The whole concern will only cost Rs. 6,065, and is to be supplied by Messrs. Fowler and Co., whose agent at Bombay was prepared on 21st May, 1885, to land the tramway at Madras in the first week of July. This is rather sharp work, as all the *materiel* had doubtless to be got out from England. The tramway is to be a Greig's portable 24-inch gauge with ton wagons. The Board of Revenue confidently anticipated a saving of one rupee per ton in the cost of carriage which, at the lowest computation of tonnage to be transported, will cover the prime cost in two or utmost three, years. It would thus appear to be a profitable investment, not to mention the great superiority of tramway over ordinary country carts for the transport of timber, &c.

III. Official Paper.

GAMBOGE OF BURMA.

Although various varieties of gamboge-bearing trees have for many years past been known to exist in different parts of the province, notably in the Tenasserim division, it was not until comparatively recently that the subject was brought specially under the notice of the local Government. Writing more than 30 years ago, Mr. Simmonds, in his work entitled *Commercial Products of the Vegetable Kingdom*, says: "The *Garcinia elliptica* of Tavoy and Moulmein affords gamboge and approaches very closely in its character to Graham's *Hebrodendron*;" and he adds that it affords "a fine pigment." Dr. Mason also, in his work on Burma, remarks that "the best gamboge is produced by *Garcinia elliptica*, but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. kydia*, *G. succifolia*, *G. xanthochymus*, and *G.* (*Hebrodendron*) *morella*. *Garcinia Cambogia* yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts."

In 1875 Mr. Whittall, of the Forest Department, drew attention to three different species of trees, belonging to the genus *Garcinia*, growing in the districts of Southern Tenasserim. These were known to the Natives as *Tawmengoot*, *Parawah*, and *Parajay*. The two last named Mr. Whittall did not consider of much account. The *Parawah* yields an exudation of a white colour, which changes to a reddish yellow on exposure to the atmosphere, and is scarcely at all soluble in water, but yields to alcohol. The *Parajay* yields a rather copious exudation which, when dissolved in spirits of turpentine, affords a beautiful, permanent, yellow varnish for metallic surfaces, and on this account has been called the gamboge tree as well as the yellow varnish tree; but its exudation does not form an emulsion with water, and, for this and other reasons, Mr. Whittall considered it had no claim to be considered a real gamboge tree. The *Tawmengoot* was, in Mr. Whittall's opinion, the gamboge tree of the South Tenasserim forests. He says: "The gum resin is larger in quantity and darker and of a more glossy colour than the others: neither wet nor dry is it so sticky, and so readily does it form an emulsion with water that the exudation on the

outer bark is completely washed away by the rains." This tree he believed to be the same as that which Dr. Mason calls *Thanataw (Garcinia elliptica)* [*G. heterandra*], and he adds that it was supposed to be the same as that which yields the gum resin exported from Siam. But Mr. Hill, Officiating Conservator of Forests, Pegu Circle, thinks the *Tawmengoot* is probably the *G. morella*, or *pictura*, or *gutta*, the true gamboge tree, which does not grow all over Burma like *G. elliptica* or *G. cowa*, which latter are common trees throughout the province.

In May 1884 the Commissioner of Tenasserim, drew the attention of District Officers to the trees called *Thaungthaleh* (*G. kydia*) and *Thanataw* (*G. elliptica*) found growing in the tropical forests of Martaban and Tenasserim with the view, if possible, of developing a new industry for the people. Of the former Mr. Hill says : " It yields a yellow substance of a bright colour, but paler than the gamboge of Siam. It is scarcely soluble in water, but dissolves in spirits of turpentine and affords a beautiful, permanent, yellow varnish for metallic surfaces. As the substance is very resinous and will not dissolve in water, it is valueless as a pigment." Of the latter he remarks : " The product known as *Thanataw* is obtained from *G. elliptica* or *heterandra*. It is called a superior gamboge, but in all probability merits the name almost as little as *Thaungthaleh* owing to its only partial solubility in water. It is found throughout the province and is darker in colour than *Thaungthaleh*." A sample of *Thanataw* obtained from Tavoy was found upon analysis to contain—

Resin,	...	...	...	76·5
Gum,	...	...	...	23·5

This sample was sent to Calcutta for valuation, where it was declared to be gamboge, but unsaleable in an unrefined state. In August of the same year samples of gum produced from two other kinds of trees called *Palagyi* and *Tawmengoot* were also obtained and submitted for analysis. They were found to contain—

				Palagyi.	*Tawmengoot.*
Resin,	...	...	...	58·82	53·20
Gum,	...	...	...	9·54	20·30
Water,	...	...	...	32·66	25·60

In his report on these samples Dr. Romanis, the Chemical Examiner, says the yellow kind (*Tawmengoot*) makes a very fair paint, but the other is of no use. If the gum is extracted it makes a spirit varnish, but when warm it melts and gets sticky.

According to the broker's report, to whom the sample of *Thanataw* referred to above was submitted for valuation, gamboge in its refined state sells in the Calcutta market at from Rs. 2 to Rs. 2-8 per seer. It arrives there freely from June

to August, usually packed in cases of from three to four maunds, and it is chiefly used in French polish and paint. In Burma the cost of collection alone is estimated by the Deputy Commissioner, Tavoy, at Rs. 25 per viss (3·65 lbs.) That is to say, the cost of collection amounts to nearly Rs. 7 per lb., while the market value of the product is only Rs. 1-4 per lb., and that too when it is in a refined state. It does not appear why the cost of collection is so great. In Ceylon the process of collection is very simple. There the gamboge is usually collected by cutting a thin slice of the bark of the tree here and there of the size of the palm of the hand. On the flat space thus exposed the gum collects and is scraped off when sufficiently dried. It may be possible perhaps to reduce the cost of collection. Unless it can be reduced very considerably, we cannot hope to introduce the Burma product into the market. From the enquiries made, then, it would appear that the *Tawmengoot* alone yields good gamboge, and that the only obstacle in the way of the gamboge succeeding as a commercial product is the high cost of collecting it. The products of the other trees mentioned are not promising because of their comparative insolubility in water.

RANGOON: *The 22nd April, 1885.*

R. A. MACK, *Of the Agricultural Department.*

ACTION FOR LIBEL AT HYDERABAD.—A Hyderabad correspondent writes:—The case brought by the Nizam's Forest Department against the Editor of the Urdu paper called the *Shafak* (*Anglice* "Twilight") and another, the alleged writer of the libel, came on for hearing on the 21st instant, before Colonel Campbell, in the Residency Court. The prosecution was conducted by Messrs. Forbes and O'Brien on behalf of the complainant, "Mahomed Abdul Mujeed," Meer Munshi in the Forest Conservative's office; the defence was conducted by Mr. Ookerjee. The case having been opened, the prosecution examined their witnesses, and then it was adjourned, because the defence had no witnesses ready.—*Pioneer.*

JY. TIMBER MARKET.

CHURCHILL AND SIM'S WOOD CIRCULAR.

LONDON, *June 4th, 1885.*

EAST INDIA TEAK.—The deliveries from the docks have been 2,421 loads against 919 loads in May of last year, and the stock is now considerably reduced, much progress having been made in moving off recent arrivals of both timber and planks. Higher prices are asked for floating cargoes.

STAVES.—The demand for *Baltic* and *Odessa* staves at this time of year is never brisk, but the dock stock is not excessive, and prices remain about the same. Very little doing in any other description of oak staves.

MAHOGANY.—The market was more than usually quiet last month, the arrivals being light and the sales small as compared with previous months this year.

CEDAR.—*Cuba*—*Honduras*—and *Mexican*.—The heavy supplies have caused a further decline in prices, and the demand even at present low figures is not active.

WALNUT-WOOD.—*American Black*.—There has been rather more demand, and in the absence of arrivals, the market has a firmer tone. *Italian*.—*Genoa* wood continues quiet, and sales are limited. *Venice* planks sell very slowly. *Black Sea*—is only saleable in small quantities and at low prices. *Burrs*.—To effect sales extremely low prices have to be accepted.

SEQUOIA (CALIFORNIAN REDWOOD).—The demand continues to improve, and 4,403 planks were sold during last month. Another cargo has arrived.

SATINWOOD.—*Porto Rico* and *St. Domingo*.—There is a good demand for large-sized and figury logs, but small, plain wood is not asked for. *Bahama* and *Jamaica*—are not enquired for.

EBONY.—*Ceylon*.—Good wood of all sizes would find ready buyers at full prices. *Madagascar* and *Mauritius*—are asked for; a parcel of the latter description has just arrived and will no doubt sell well.

Price Current of Wood.

	£	s.		£	s.
Oak Staves— per mille pipe.					
Memel, Crown Pipe, ...	180		to	190	
Brack, ...	140		to	150	
Odessa, Crown Pipe, ...	165		to	175	
Danzig, full sized, ...	160		to	165	
No. 2, ...	96				
Canadian standard Pipe, ...(nominal)	65				
Puncheon, per 1,200 pieces,	18		to	21	
Bosnia, single Barrel, ...(nominal)	24		to	25	
United States, Pipe, ...	30		to	50	
Hogshead, extra heavy and double extra,	25		to	35	
Indian Teak— per load,	12	10	to	16	
British Guiana Greenheart, ...	6	10	to	7	15
Australian Ironbark, ...(nominal)	7	10	to	8	10
	s.	d.		s.	d.
Mahogany— per foot superficial					
Honduras, ... cargo average,		4½	to		6½
St. Domingo Curls, cargo average,	1		to	1	8
Cedar, Cuba, ...		3¾	to		4¼
Honduras, Mexican, &c., ...		3	to		4
Australian, ...		3	to		3¼
Pencil, per foot cube,	3		to	4	
Walnut, American, ...	3		to	5	
Italian, per foot superficial		4	to		5½
	£			£	
Back Sea, ... per ton,	5		to	7	
	s.	d.		s.	d.
Sequoia (Californian Redwood), per foot cube,	2	6	to	2	9
	£			£	
Satinwood, St. Domingo—					
East India, ...(nominal)	5		to	6	
Rosewood—					
East India, ...(nominal)	5		to	6	
Ebony, Ceylon, ...	9		to	14	
Boxwood, Turkey, ...	5		to	18	

V. Notes, Queries and Extracts.

The Madras Government have recently had under consideration the question of modifying the orders in regard to the exercise of the permission to hunt, shoot, and fish in Government forests generally, and with reference to "reserved lands" of the Nilgiris in particular. In this connection the following rules, under section 4 (*h*) of the Madras Forest Act (Act V. of 1882), for the Reserved Forests of the Nilgiri District, have been approved and issued by the Government of Madras :—

1. Any person who may desire to hunt, shoot, or fish within the limits of the Nilgiri reserved forests during the season in which such hunting, shooting or fishing is allowed under the Nilgiris Game and Fish Preservation Act (Madras Act II. of 1879), and the orders of Government issued under it, shall be bound to take out a yearly pass at the office of the Collector of the Nilgiris.

2. The payment to be made for each such pass will be Rs. 15, and the said pass will not be transferable. It will be available only for the currency of the calendar year to which it relates, whether it be taken out at the commencement of, or during, the year.

3. The Collector may, from time to time, by notification in the District Gazette, declare that any particular reserved forest shall be closed against hunting, shooting, and fishing in any year or during any portion of a year, and after the publication of such notification, no pass taken out under Rule 1, will be held to give authority to hunt, shoot, or fish in such closed reserved forests.

4. The poisoning of water or the setting of traps or snares for game in any reserved forest in the Nilgiri district is absolutely forbidden.

5. Any breach or infringement of these rules will render the offender liable to imprisonment for a term which may extend to six months, or to fine which may extend to Rs. 500, or to both, in addition to such compensation for damage done to the forest as the convicting Court may direct to be paid.

It is to be understood that, as hitherto, the fees will be credited, not to Forest Revenue, but to the Game Preservation Fund.

Mr. Gamble, Conservator of Forests, Northern Division, when recommending the adoption of the above rules, did not think that it would be possible to have one rule for both "reserved

forests" and "reserved lands," although, undoubtedly, the different penalties prescribed by the Act in one and the other case constitute a difficulty. He was of opinion that the difficulty would disappear by degrees as "reserved lands" were converted into "reserved forests." The only localities in which, in his opinion, it was advisable to stop the shooting, were those sholas which, having been lately cut over, were now under reproduction, and the plantations, many of which were fenced and easily recognised.—*Indian Agriculturist.*

ACCORDING to the *Civil and Military Gazette*, the following rules have been passed by the Maharaja of Cashmere for the regulation of shooting within his territories :—

1. Killing game without a license is prohibited throughout the dominions of His Highness the Maharaja of Cashmere and Jummoo.

2. Licenses can be obtained by Europeans from the officer on special duty, and by Natives from the Governor of Cashmere.

3. Licenses are not transferable ; require renewal annually ; and do not give permission to any person employed by the holder to kill game.

4. Killing game is forbidden in the province of Jummoo proper, in that part of Cashmere lying between the Sind and Lidar rivers, and in such places as are, or may hereafter be, reserved by His Highness throughout the country.

5. The destruction of the females of the following animals is prohibited—Bara-Singha, Ibex, Markhor, Ovis Ammon, Shapoo, Burhal, Thibetan Antelope, Thibetan Gazelle. The destruction of Bara-Singha stags when hornless or in velvet is also prohibited. The destruction of Yak is altogether forbidden in the dominions of His Highness. Any necessary or accidental breach of any part of this rule should be reported at once to the officer on special duty.

6. A close season, lasting from the 31st March (1st Baisak) to the 25th August (29th Sraban) inclusive, has been established for the following winged game :—Moonal, Argus, Cheer, Koklas, and Kalej Pheasants, Black and Chikor Partridges.

7. Licenses may be revoked at any time in case of infringement of these rules.

STATE OF JUMMOO AND CASHMERE.

License to kill game.

To all whom it may concern. The bearer of this license..... .....is hereby authorised to kill game in the dominions of His Highness the Maharaja of Jummoo and Cashmere, until the end of the year eighteen hundred and eighty-five, subject to the conditions printed on the back.

VI. Extracts from Official Gazettes.

1.—Gazette of India—

No. 1791.—*The 27th June, 1885.—Mr. A. E. Lowrie,* Assistant Conservator of Forests, 3rd grade, sub. *pro tem.*, is promoted to 2nd grade, sub. *pro tem.*, under the provisions of Sections 29 and 30 of the 2nd Edition of the Forest Department Code, as modified by Standing Orders VIII, 3 and 4, with effect from the 7th February, 1885.

No. 2375.—*The 8th July, 1885.—Mr. J. McKee,* Superintendent of Forests, Rewah State, is granted privilege leave for three months, with effect from the 25th July, 1885, or such subsequent date as he may avail himself of it.

2.—Calcutta Gazette—

Nil.

3.—North-Western Provinces and Oudh Gazette—

No. $\frac{2311}{\text{II-448-5-7}}$.—*The 1st July, 1885.—Mr. A. G. Hobart-Hampden,* Assistant Conservator of Forests, 2nd grade, privilege leave for three months, with effect from the 7th July, 1885, or subsequent date.

No. $\frac{2316}{\text{II-448-11-2}}$.—*The 1st July, 1885.—Mr. C. J. Ponsonby,* Officiating Conservator of Forests, Oudh Circle, furlough for eight months, under Section 50, Chapter V., of the Civil Leave Code, with effect from the 28th July, 1885, or subsequent date.

4.—Punjab Gazette—

No. 672.—*The 13th July, 1885.—Mr. J. Copeland,* Assistant Conservator of Forests, 2nd grade, is appointed to officiate as Assistant Conservator in the 1st grade, with effect from the 1st of June, 1885.

No. 751.—*The 20th July, 1885.—Messrs. E. Murray,* and *J. E. Barrett,* Assistant Conservators of Forests, 3rd grade, sub. *pro tem.*, are promoted to Assistant Conservators of the 2nd grade, sub. *pro tem.*, with effect from the 8th of February, 1885.

No. 765.—*The 22nd July, 1885.*—In Punjab Government Notification No. 176, dated the 15th of April 1885, placing the services of *Mr. A. Watson,* Officiating Assistant Conservator

of Forests, at the disposal of the Chief Commissioner of the Central Provinces, the word *temporarily* should be omitted.

5.—CENTRAL PROVINCES GAZETTE—

No. 2492.—*Mr. E. Dobbs*, Assistant Conservator of Forests, on deputation at Cyprus, reported his arrival at Bombay on the afternoon of the 25th ultimo, and was directed to report himself at the Secretariat for orders.

Mr. Dobbs is appointed to the charge of the Seoni Forest Division.

No. 2581.—*The 9th July, 1885.*—Consequent on the departure on furlough of *Mr. G. H. Foster*, Deputy Conservator of Forests, the following temporary promotion is made with effect from the 28th March last:—

Mr. J. Ballantine, Officiating Deputy Conservator of Forests of the 4th grade (in Berar) to officiate as Deputy Conservator of Forests of the 3rd grade.

Notification No. 1476 of the 21st April last is cancelled.

No. 2599.—Consequent on the absence of *Mr. W. Jacob*, Deputy Conservator of Forests, 1st grade, on privilege leave from 19th July to 18th October, 1884, the following temporary promotions are made:—

Mr. R. Whittall, Deputy Conservator of Forests, 3rd grade, to officiate as Deputy Conservator, 2nd grade, from 19th July to 9th August, 1884, and again from 16th September to 18th October, 1884.

Mr. G. F. Prevost, Deputy Conservator of Forests, 4th grade, to officiate as Deputy Conservator, 3rd grade, from 19th July to 18th October, 1884.

No. 2600.—Consequent on the absence on privilege leave of *Mr. R. Whittall*, Officiating Deputy Conservator of Forests, 2nd grade, *Mr. W. P. Thomas*, Deputy Conservator of Forests, 3rd grade, officiated as Deputy Conservator of Forests, 2nd grade, from 10th August to 15th September, 1884.

6.—BRITISH BURMAH GAZETTE—

The 24th June, 1885.—*Mr. J. Murray*, Assistant Conservator of Forests, passed the Forest Department Examination in Law and Land Revenue.

No. 41.—*The 2nd July, 1885.*—The following alterations in rank are ordered in the Forest Department:—

(1) Consequent on the departure on furlough of *Mr. J. N. Pickard*, Deputy Conservator of Forests, with effect from the 4th April, 1885:

Mr. H. B. Ward, Assistant Conservator, 1st (Officiating Deputy Conservator, 4th) grade, to officiate as Deputy Conservator, 3rd grade.

(2) Consequent on the retirement from the service of *Mr. J. Adamson*, Deputy Conservator of Forests, with effect from the 29th April, 1885:

Mr. C. W. Palmer, Deputy Conservator, 4th (officiating 3rd) grade, to be Deputy Conservator, 3rd grade.

Mr. H. B. Ward, Assistant Conservator, 1st (officiating Deputy Conservator, 3rd) grade, to be Deputy Conservator, 4th grade, but to continue to officiate as Deputy Conservator, 3rd grade.

7.—Assam Gazette—

No. 215.—*The 2nd July, 1885.*—Privilege leave of absence for one month, under Section 138, Chapter X. of the Civil Leave Code, is granted to *Babu Tara Kishor Gupta*, Sub-Assistant-Conservator of Forests, on special duty in the Gáro Hills, with effect from the 1st June, 1885, or the subsequent date on which he may avail himself of it.

No. 216.—Privilege leave of absence for three months, under Section 138, Chapter X. of the Civil Leave Code, is granted to *Mr. T. J. Campbell*, Assistant Conservator of Forests, with effect from the 13th July, 1885, or the subsequent date on which he may avail himself of it.

No. 217.—During the absence of *Mr. T. J. Campbell*, Assistant Conservator of Forests, *Mr. W. B. Savi*, District Superintendent of Police, is placed in charge of the Gáro Hills Forest Office in addition to his own duties.

8.—Mysore Gazette—

Nil.

9.—Madras Gazette—

Nil.

10.—Bombay Gazette—

The 26th June, 1885.—*Mr. W. G. Clabby, pro tem.* Sub-Assistant Conservator of Forests, 3rd grade, after being relieved of the Divisional Forest Office, East Khándesh, reported himself for duty to the Divisional Forest Officer, Násik, on the 17th June, 1885, before office hours.

The 29th June, 1885.—*Mr. R. H. Madan, pro tem.* Sub-Assistant Conservator of Forests, 3rd grade, and *Mr. H. Mainwaring*, Deputy Conservator of Forests, 4th grade, respectively delivered over and received charge of the office of the Surat Forest Division on the 23rd June, 1885, after office hours.

The 13th July, 1885.—*Mr. W. G. Clabby*, Sub-Assistant Conservator of Forests, passed an examination in Maráthi on the 6th instant.